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WYOMING

RESOURCES, POPULATION,
INDUSTRIES, OPPORTUNITIES,
AND CLIMATE



Revised to August, 1909

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WYOMING

RESOURCES, POPULATION,
INDUSTRIES, OPPORTUNITIES,
AND CLIMATE



Revised to August, 1909

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WYOMING
UNION PACIFIC RAILROAD COMPANY
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WYOMING EPITOMIZED

The assessment of the State of Wyoming for 1908 was \$67,941,783.22.

Wyoming is in size the eighth State in the Union. It is more than ninety-seven times the size of Rhode Island.

The State has nearly 100,000 square miles of area, 160,000 population, \$150,000,000 of wealth, and extensive undeveloped resources.

About 30,000 square miles of the State are underlaid with coal: but excepting coal, the mineral wealth of Wyoming has been but slightly developed.

Wyoming will, perhaps, become more noted for her oils than any other product. Oil is found in large areas and there are twenty-two fields.

Mountains of iron and generous deposits of gold, silver, copper, lead, mica, cinnabar, tin, sulphur, soda, borax, asphaltum, gypsum, graphite, magnesium, asbestos, kaolin and mineral paint are found, also marble, sandstone, limestone, granite, slate and other decorating and building stones.

The mineral wealth of Wyoming is more than sufficient to pay the national debt, as will be demonstrated by future development.

Natural gas exists in many localities.

Brick clay exists in all parts of the State.

There are 127,313 horses, 711,305 cattle and 131,182 sheep graze on the ranges of Wyoming.

Nutritious grasses, curing where they grow, furnish abundant food for both domestic animals and wild game.

Irrigation is largely depended upon to raise farm products. With irrigation alfalfa makes from two to four crops a year, and grain and vegetables make a phenomenal yield.

The Union Pacific Railroad runs nearly 500 miles through Southern Wyoming, and south from Cheyenne to Denver. The Colorado & Southern runs north from Cheyenne. The Oregon Short Line runs northwest from Granger, in the western part of the State.

The climate of Wyoming is cool in summer and mild in winter, with but few snow storms, which are usually accompanied by wind, preventing a complete covering of the ground. While subjected to occasional heavy snowfalls, the average winters are neither severe nor long. There are few cloudy, and many sunny days, and it is healthful in the highest degree.

The many rivers of Wyoming, with their numerous branches, water large tracts of land and also furnish food fishes.

Wild game abounds in nearly every portion of the State, and its wanton slaughter is prohibited by law.

A large portion of the public lands has not yet been surveyed, and much of that which has been surveyed is still unoccupied.

There is room for all, in agricultural pursuits, mining, stock-raising or other business.

The birds of Wyoming include 288 species.

Yellowstone National Park is nearly all within the borders of Wyoming. Its scenery and its wonderful freaks of nature are unequaled in the world. (See page 75.)

Business in Wyoming is very prosperous, along all lines.

There are fifty newspapers printed in the State, four of them dailies.

The people of Wyoming are of high average in education and general habits. The early settlers came from nearly every part of the world, but later they came chiefly from the Eastern and Southern States.

Public schools are maintained throughout the State, and teachers are carefully selected.

The church edifices are numerous, and many of them are costly and of high order of architecture. The churches are generally attended.

The laws of Wyoming are good and generally applicable to the country, and the people are law-abiding.

The State created the office of mining inspector to secure the safety of the men employed in the coal and other mines.

The office of State geologist is maintained to encourage the development of mining.

Wyoming has a State veterinarian, and careful inspection and prompt action combine to exterminate all cases of contagious diseases among animals brought into the State. An occasional case of glanders among horses and scab among sheep are the only contagious diseases among animals. District sheep inspectors promptly exterminate scab in sheep.

The office of State engineer provides a skillful official, whose duties are to encourage, superintend and control irrigation.

The State has a fish hatchery for the purpose of stocking streams not already provided, and a competent fish commissioner is in charge.

The social status of Wyoming is excellent. Societies, literary, social, secret and others are well represented and satisfactorily supported.

Wyoming has a law library of 20,000 volumes. There are laws providing for free county libraries, found in the larger towns, a small tax being levied for their support.

The flora of the State comprehends, in addition to 2,000 species of flowering plants, large varieties of grasses and some sixty species of mosses, lichens and various species of tree flora, the latter more fully described under the heading of timber and lumber supply.

The fauna of Wyoming is extensive in its genera and species. Perhaps no State or Territory excels in this. Some sixty-eight species of food fishes abound in our watercourses and lakes.

Some sixty species of mammals abound, including game animals.

Wyoming now has a population more than double that of either Alabama, Missouri, Ohio, Oregon, Illinois and some other states when admitted.

Woman's suffrage, first adopted in 1869, is favored by both political parties.

Wyoming is becoming noted as a resort for those in search of health, and strength and the highest physical development.

The Indians of Wyoming are not warlike, and efforts are being made to educate them in farming and other industrial pursuits.

Financial standing in the State—public, private and corporate—is high.

There are four companies of Wyoming National Guards, already organized and equipped.

Of one thousand young men who enlisted in Wyoming during June, 1898, not one was unable to sign his name to the muster roll, and every man had received a fair education.

Wyoming furnished more volunteers during the Cuban trouble for the United States army, in proportion to population, than any other State in the Union, and with fewer rejections in proportion to the number examined.

Wyoming has one county, Fremont, with an area equal to that of Massachusetts, New Jersey, Delaware and Rhode Island combined.

The mineral paint of Wyoming is the best ever used on bridges, roofs and other structures exposed to the elements.

The people of Wyoming have \$48,000,000 invested in irrigated canals, ditches and reservoirs, which is not included in the assessed valuation of the land on which the same are located.

The high mountain ranges of the State shield its valleys from the severe blizzards so common in some of the Western States and Territories.

Rainfall in Wyoming averages on the plains about twelve inches; on the mountains perhaps three times as much.

There are seventy-five banks in Wyoming.

Interest rates are from 6 per cent to 12 per cent.

Live-stock and mining industries furnish an excellent market for all kinds of produce.

Wyomings public buildings comprise the capitol, university, fish hatchery penitentiary, asylum for insane and State hospital.

Wyoming has telephone exchanges and good telegraphic advantages.

The mean altitude is about 6,000 feet, ranging from 3,500 to 14,000.

The State produces annually a large amount of hay. Small grains do remarkably well. The soils are generally rich, the only fertilizer needed being water. The sagebrush districts raise good crops when subjected to irrigation.

Four-fifths of the counties in Wyoming have substantial and commodious brick or stone court houses.

Wyoming has a compulsory school law, and the teachers are carefully selected.

Heavy forests cover over 7,000,000 acres of Wyoming, and there are about 15,000,000 acres having more or less timber.

School and university lands are rented in Wyoming, and rental applied to support the public schools.

Sixteen per cent of Wyoming's population is in the public schools.

The streams of Wyoming furnish water enough to irrigate 18 to 20 per cent of its area.

Wyoming's wool crop for 1908 was 37,213,024 pounds, valued at \$6,004,084.

Wyoming's largest potato crop is 974 bushels per acre.

WYOMING'S PROGRESS.

BY GOVERNOR BRYANT B. BROOKS.

Despite the widespread financial panic of 1908, and the general business uncertainty and stagnation, caused by the presidential election, the curtain falls on one of the most progressive years in Wyoming's history, and we can truthfully announce that all signs indicate even greater prosperity and more rapid development during 1909.

In agriculture, both by irrigation and dry farming methods, in stock-raising, coal mining, banking and merchandising, we have safely passed the experimental stage, and, with accumulated wealth and knowledge gained in the hard school of experience, we are rapidly and successfully developing other natural resources. In this gigantic task there are opportunities for all, and Wyoming extends cordial welcome to men with capital, brains, brawn and courage, who will join with us in developing our numberless natural resources. Success is assured. The pioneers have blazed the way, and millions of dollars' worth of experience can now be had for nothing.

Present conditions are very different from those of even a comparatively few years ago. To-day the newcomer is not staggered by the dreary loneliness, privations and hardships of the earlier pioneer. Wagon roads, railroads, and telephones cover Wyoming like spider webs. The rural free delivery brings the daily mail with all the news of the outside world. The telephone summons aid or assistance on a moment's notice. The near-by railroad takes the produce of the farm and leaves the product of the factory. Every necessity and luxury that money can buy will be delivered on short notice at your very door. The church is near at hand, ready to afford spiritual consolation, and the schoolhouse doors are open to educate the children. The laws are firmly established for the protection of all.

In farming, stockgrowing, mining and merchandising no guesswork is needed. Expensive experimenting is unnecessary. The guideposts are all set, and near-by neighbors welcome the stranger and are ready to explain just why, when and where to plant the seed that will insure an abundant harvest. Great things have been accomplished in this pioneer work, and yet, despite all that has been done, our resources are so stupendous and opportunities so numerous that all that has gone before is but a drop in the bucket compared with what still remains to be done.

During the past year Wyoming's increase in population far exceeds any previous period. Every section and every industry pulsates strongly with this infusion of new blood; a general spirit of energy and optimism prevails. Our agricultural progress has been so substantial and gratifying as to arrest widespread attention; in fact, our own people are but just beginning to appreciate the magnitude of Wyoming's agricultural resources.

Not only is cultivation under irrigation increasing, but in many sections industrious farmers are testing dry farming methods, and by proper preparation of the soil, through tillage and careful selection of seed, are demonstrating that many million acres, heretofore considered valuable for grazing only, can profitably be farmed.

A glance at the irrigation development in Wyoming during the last four years will indicate some of our agricultural possibilities. During this period our State engineer's office has issued water permits for the reclamation of over 3,000,000 acres of land. To bring about the reclamation of this vast area will require an investment of at least \$50,000,000. The canals that must be built to supply water for this land will have a total length of over 6,000 miles. We are constructing better irrigation works than ever before, and, as the necessity for storage is growing each year, many new systems now under way are providing for expensive storage reservoirs. During this period 804 reservoir permits have been issued as against 575 such permits issued for the entire preceding fourteen years of our State's history. Moreover, a wonderful increase has been made in the average storage capacity of reservoirs, to which these permits refer.

During the past two years permits have been issued providing for the construction of reservoirs to impound 1,279,300 acre-feet of water, while during the two previous years permits were issued for the storage of but 276,750 acre-feet of water. While the greatest development is still being carried on by private parties who do not receive the protection afforded either by the Carey Act or by the United States Reclamation Act, yet wonderful progress has been made under these two special statutes.

The largest irrigation system in the State is being carried on independent of these laws, and when completed 300,000 acres will be reclaimed in a single tract. The detailed plans for this great project are the most complete and the most modern in general design and minute detail that have yet been filed in the office of the State engineer. The main canal of this system, which is located on the ceded lands of the Shoshoni Indian reservation, will be the largest irrigation canal in the United States. It will have a total length of approximately sixty miles. The surface width is 132 feet, and it will carry water to a depth of fourteen feet. This canal will have a capacity of 4,000 cubic feet of water per second of time, and it is safe to prophesy that in the near future this district will witness one of the most remarkable agricultural developments ever known.

Under the Carey Act, permits have been issued for the reclamation of 1,000,000 acres. Under this act six projects have been practically completed, and rapid progress is being made on as many more.

Under the United States Reclamation Act, the great Shoshone Dam, 325 feet high, the highest in the world, will be completed during the season of 1910. The Corbett Diversion Dam, connected with this system, is completed, also the Corbett Tunnel and Great Canal, which is this year supplying water for the lands near Frannie. Laterals under this system have been finished, and 30,000 acres are ready for settlement. The expenditure of this one government project from the beginning of the work to the present time amounts to over \$2,500,000.

The work on the Pathfinder project on the North Platte River is progressing rapidly. The great Pathfinder Dam, 240 feet high, will be finished in the near future. The Interstate Canal has been practically completed, so far

as to cover the lands lying within the boundary of Wyoming. One million dollars has already been spent on the Pathfinder Dam alone, and it will require the expenditure of several times as much before the entire project is completed.

Plans are now under way for the construction of a diversion dam at Guernsey, which will be the first step toward carrying out the great Goshen Hole Canal project, which will bring under irrigation over 200,000 acres of land in northern Laramie County.

Under Carey Act projects alone over 500 families have taken up land during the past year. Wyoming to-day has a larger amount of irrigable land still subject to reclamation than any state in the Union, and owing to this condition offers greater opportunities for the capitalist and prospective settler than any other state.

At present the principal crops grown on irrigated lands are alfalfa, timothy, native hay, oats, wheat and other varieties of grain, which are mostly consumed at home in feeding and fattening countless thousands of live stock. These lands are so rich in potash, lime, magnesia and other valuable soil ingredients that fertilizers are unnecessary, and all kinds of fruits, grains and vegetables can be grown successfully. The water is applied to the fields at exactly the right time, and in exactly the right quantity to produce the greatest results to the growing vegetation, and in these irrigated sections farming is conducted under almost ideal conditions. Our invigorating climate makes work a pleasure, our clear, bright days make the cultivation and harvesting of crops an assured success. Day in and day out the cultivating, haying and harvesting go merrily on, without the vexatious delays and damage caused by cloudy or rainy weather. The hay goes into the stack, bright and full of nourishment. Oats and wheat remain shocked in the fields, curing in the bright sunshine, without the danger of getting irreparably damaged by a prolonged wet spell. As the season advances and the sun rises higher and higher in the blue heavens, the farmer is not worn out by the nightmare of possible drouths. Crop failures, resulting from wornout soil or too much wet or too much dry, are unknown. The growing crops are carefully studied, and the moisture is always at hand, ready to be supplied at need. As the saying goes, "Irrigation is not a substitute for rain, but rain is rather a poor substitute for irrigation."

To-day we have only about 1,000,000 acres cultivated under irrigation, but we have suitable land, with sufficient available water to irrigate 8,000,000 acres.

Aside from this agricultural development under irrigation, the past year has been a notable one for the progress made by our dry farmers. More land has been filed upon during the past year for this purpose than ever before, and the march of settlement has but just begun. Wyoming has 300,000,000 acres of public land, still inviting private ownership. Some day every acre of it will be serviceable and valuable. Our irrigation development is still in its infancy, even the real value of irrigated lands remains to be demonstrated, but I venture the assertion that fifteen years from now present prices will appear ridiculously low, and the dry farming lands will increase in value proportionately.

The development of our mineral resources will add to the price of farm lands by furnishing the greatest local, or home, market on earth. The dream of economists of bringing the factory and farm together will become a reality, for as the surface of our great plateaus furnishes a rich and inexhaustible field for the labor of the farmer, yet underneath lie other rich and inexhaustible supplies for his brother miner. Our 7,000,000 acres of undeveloped, irrigated land is over-matched by our 20,000,000 acres of undeveloped coal measures.

The rushing mountain torrents not only supply the fertilizing waters, but can furnish water power to make cheap electricity to supply the energy for mines, factories and smelters. Iron ore is here in quantities beggaring description, while the mountains are full of hidden treasures of copper, silver, gold, asbestos and all the precious minerals. The oil is here to lubricate the spindles and car wheels of the world. The dry farmer can not begin to supply the urgent demands of stockmen, whose flocks and herds, numbering millions, graze in the surrounding hills.

During the past year we produced over 6,000,000 tons of coal and thirteen new producing mines have been opened. We now have over fifty coal mines, employing 8,000 men. Our production of copper for the year 1908 amounted to 5,000,000 pounds, and iron 1,000,000 tons. During the year the results of prospecting and development work in the Copper Mountain country, in Fremont County, has been encouraging. The Williams-Lumen mine, in this district, is showing the greatest body of copper ore that has been discovered since the opening of the Butte and Anaconda producers. Even at a depth of 500 feet the extent of this great ore body can only be approximated.

During the year there has been an increased interest in placer mining in many sections. Several power plants are under way, and in several sections great quantities of natural gas have been discovered. Our oil fields are extensive, and we now have quite a number of large producing wells. Quite recently a great spouter, yielding several hundred barrels per day, has been brought in in the Salt Creek field. Unfortunately at present we have no pipe lines, and the opportunities for profitably marketing the Wyoming oils are poor.

Wyoming still holds its lead in the growing of live stock, having more sheep and producing more wool than any State in the Union, and the number of our cattle and horses, as well as sheep, is steadily increasing. During the past year endurance tests have demonstrated beyond all question that horses grown in this high altitude, nourished on our luxurious grasses and exercised on our broad plains and high plateaus, have undreamed of strength of bone, muscular development and general soundness of wind and limb. For all purposes it is clearly demonstrated that they are superior in every way. Great progress has been made in the breeding of better and more profitable types of live stock.

The cities of Wyoming are prosperous and progressive. Two of the largest cities in the State have recently voted three quarters of a million dollars for extensive and up-to-date water systems. A notable increase in

the taxable valuation of property has been made, and the increased assets in our banks demonstrate conclusively that the Wyoming people are accumulating wealth.

During the past ten years our banking business has increased four times in volume, and the stability of our financial institutions is unquestioned. In probably no other State has the percentage of losses on loans been so small. Not a banking institution has failed during the past year. We now have over 1,600 miles of railroad in Wyoming, and many more extensions are contemplated.

Taken as a whole, the year 1908 has been one of the most promising in our history, and we have every assurance of rapid future development.

RECORD FOR THE YEAR 1908.

Population (based on vote of 1908 and school census).....	160,000
Area of state, square miles.....	97,890
Area subject to entry under U. S. land laws, acres.....	36,000,000
Area that can be irrigated, acres.....	9,800,000
Area entered for dry farms, acres.....	600,000
Lands reclaimed, acres.....	48,000
Permits for new ditches.....	2,033
Area to be covered by new ditches, acres.....	1,352,249
Miles of canals in above permits.....	3,618
Cost of construction of above canals and works.....	\$13,588,235.00
Total cost of irrigation works completed and under way.....	\$48,000,000.00
Value of farm and grazing lands.....	\$28,500,000.00
Value of all property as returned for assessment.....	\$67,941,783.22
Increase over 1907.....	\$3,522,605.24
State's bonded debt (\$20,000 less than 1907).....	\$160,000.00

WHAT WYOMING PRODUCED IN 1908.

MINERAL PRODUCTION.

Coal, 5,426,329 tons, estimated value.....	\$16,278,987.32
Number shipping coal mines, 52.	
Mines opened in 1908, 13.	
Number men employed in coal mines, 7,702	
Iron, 950,000 tons, valued at.....	950,000.00
Gold, \$120,000; copper, \$515,000; silver, \$20,000.....	655,000.00
Building stone, asbestos, onyx, etc.....	110,000.00
Total.....	\$17,993,987.32

LIVE STOCK EXPORTED.

Sheep, 904,245; value.....	\$ 3,843,041.25
Cattle, 248,000; value.....	8,000,000.00
Horses, 15,000; value.....	1,500,000.00
Swine, 8,000; value.....	80,000.00
Total	\$13,423,041.25

OTHER PRODUCTS.

Wool exported in 1908, 37,213,024 pounds. Value.....	\$ 6,004,084.00
Agricultural products. Value.....	21,000,000.00
Manufactures. Value	1,500,000.00
Oil production. Value.....	800,000.00
Grand total	\$60,721,112.57

LIVE STOCK IN STATE, JANUARY 1, 1909.

Sheep, 5,131,182. Value.....	\$23,090,719.00
Cattle, 711,305. Value.....	15,801,625.00
Horses, 127,313. Value.....	136,560.00
Swine, 7,000. Value.....	70,000.00
Total	\$39,098,904.00

AREA

ACTUAL AND COMPARATIVE.

Wyoming, one of the youngest of the States, occupies a space between the 27th and 34th meridian of longitude west, and the 41st and 45th degree of north latitude, about 2,000 miles west from the Atlantic Ocean and 800 miles east of the Pacific, forming a parallelogram 355 miles east and west by 276 miles north and south, and contains 97,890 square miles, or 62,645,120 acres, an area about as large as the six New England States and Indiana combined. It is bounded by Montana on the north, Dakota and Nebraska on the east, Colorado and Utah on the south, and Utah, Idaho and Montana on the west.

The State takes its name from the wonderful Wyoming Valley, in Pennsylvania, and is supposed to be a corruption of the Indian name "Maugh-waumame," meaning large plains.

GENERAL PHYSICAL FEATURES.

It would be impossible to find a greater contrast in the physical features of a State than one finds in Wyoming. The great plains in their western sweep abut against the easterly mountain ranges or pass about their terminations as they reach westward toward South Pass, or northward toward Montana. From the plains the lower portion of the State passes into plateaus, broad valleys leading to the greater mountain ranges and deserts that occupy the broad arid expanses between the elevated areas. It may seem singular, but is no less a fact, that a person can pass from east to west across Wyoming and not cross a mountain range. The Union Pacific Railroad crosses only the Rocky Mountains in its course across the State. From the plains and table lands the mountains rise in their majestic grandeur, with the hundreds of water courses, curiously carved cañons, inaccessible nooks and peaks, which are in part clothed with a dark green verdure that from a distance causes the mountains to appear black, above which tower the peaks of eternal snow. The story of the sister States and their wonderful scenery has largely been written; but that of Wyoming must be done by some one in the future. There are treasures of the rarest kind awaiting the ambitious in the great mountain ranges of the interior. No State offers to the poet or the artist greater opportunities than Wyoming does at the present time.

HISTORY

IRVING'S PREDICTION BELIED.

Wyoming was organized as a Territory July 25, 1868, from what was then the southwestern portion of Dakota, northeastern part of Utah and eastern part of Idaho. July 10, 1890, the Territory was admitted as a State by act of Congress; being the forty-fourth State in order of admission.

The country, in 1868, was to a great extent unexplored, wild Indians roved over the greatest portion of the Territory, and life and property were nowhere secure. There was but a mere handful of white settlers within

its borders, probably less than 3,000 actual residents. These had taken up their abode at South Pass as gold miners, or followed the construction of the Union Pacific Railroad, which entered near the southeast corner and traversed westward along the southern part of Wyoming, making possible the organization and settlement of the Territory.

Previous to 1840 little was known of the country west of the Missouri. Its mineral wealth remained undiscovered, and no one had been successful in reclaiming, by cultivation, the land from its desert character. Even as late as 1843, Washington Irving, in the "Adventures of Captain Bonneville," describing the Rocky Mountain region now occupied in part by Wyoming, makes the following prediction of the future of the country and its people:

"Some new system of things, or rather some new modification, will succeed among the roving people of this vast wilderness; but just as opposite, perhaps, to the inhabitants of civilization. The great Chippewyan chain of mountains and the sandy and volcanic plains which extend on either side are represented as incapable of cultivation. The pasturage which prevails there during a certain portion of the year withers under the aridity of the atmosphere, and leaves nothing but dreary waste. An immense belt of rocky mountains and volcanic plains, several hundred miles in width, must forever remain an irreclaimable wilderness, intervening between the abodes of civilization, and affording a last refuge to the Indian. Here roving tribes of hunters living in tents or lodges, and following the migrations of the game, may lead a life of savage independence, where there is nothing to tempt the cupidity of the white man. The amalgamation of various tribes and of white men of every nation will in time produce hybrid races like the mountain Tartars of Caucasus. Possessed as they are of immense droves of horses, should they continue their present predatory and warlike habits, they may in time become a scourge to the civilized frontiers on either side of the mountains, as they are at present a terror to the traveler and trader."

It is not strange that Irving, with a matchless power of description, should have laid the foundation of an opinion of the utter barrenness of the Rocky Mountain Region that it is almost impossible to remove from the minds of those who have not witnessed the marvelous growth of the far West, even to this day. He little dreamed what railroads, the discovery of vast mineral wealth, and the application of modern machinery would do in developing the vast resources of the West. No more can we, comparing the past with the present, comprehend the great destiny that awaits the development of Wyoming within the next fifty years.

As late as 1870, the total population of Wyoming did not exceed ten thousand. The entire northern part of Wyoming was overrun with Indians, and it was not until 1876-77 that General George Crook succeeded in bringing these warlike tribes to peace.

Just prior to the coming of the Union Pacific Railroad, gold had been discovered in the South Pass country, which caused a rush from the Montana diggings; but the real settlement of the State was absolutely dependent upon the railroad, which not only caused towns to spring up, but furnished an outlet

for the wilderness to the north and south, and made the Indians fall back into the unknown regions, to allow the white settlers a chance. The early settlers were largely dependent upon the grazing industry, for it was possible to drive herds of cattle and horses a long way to the railroad, which would allow them to sell in the Eastern markets. This industry flourished beyond description as long as cattle and horses would bring a reasonable price in the East. Early in the '80's prices commenced to fall and within a few years nearly all of the large companies had to go out of business. In later years many have resumed, and vast numbers have invested in the sheep industry, which is of more importance to the State at the present time than either cattle or horses. With the development of the grazing interests came that of mining, and especially coal mining, which is to-day the greatest industry in the State.

ITS MANY RULERS.

The largest part of the present State was acquired by the Louisiana Purchase from France in 1803; but important areas in the southern and western part of the State originally belonged to Mexico and Oregon, and a very small area in the central southern portion was added by the annexation of Texas.

Wyoming enjoys the unique distinction of having been under more rulers and more kinds of government than any other State in the Union. According to Dr. Grace Raymond Hebard's excellent work on "The Government of Wyoming," it has been under Ferdinand and Isabella, Charles I., Philip II., Philip III., Philip IV., Charles II., Philip V., Ferdinand IV., Charles III., Charles IV., Ferdinand VII. and Joseph Bonaparte of Spain; Francis I., Henry II., Francis II., Charles IX., Henry III., Henry IV., Louis XIII., Louis XIV., Louis XV., Louis XVI., the Republic and the Consulate of France, and Louisiana, Missouri, Texas, Oregon, Utah, Nebraska, Washington, Dakota, Idaho, and Wyoming of America. It is the only State that contains lands obtained from all four of our principal annexations which form the territory west of the Mississippi River.

ATTRACTIONS

WONDERLANDS FAR FROM RAILROADS.

Unlike the other Rocky Mountain States, but very little has been written concerning the scenery in the various mountain ranges of this State. This has been due largely to the fact that none of the Wyoming railroads has ever penetrated the rough and mountainous country; but on the contrary all have kept far from it, so that it has not until recently been possible for the average tourist to visit the unknown regions since there was no reasonable mode for transportation, and no place to stop after they had made a long journey to devote a few days to sight seeing. These conditions are rapidly changing and within a few years the wonderlands of Wyoming will be within easy reach of all who wish to enjoy the wonders of nature that have been lavished upon the State.

The interesting places are numerous, and it is common in these days for tourists to club together and hire an outfit to take them to some

of these marvels of the mountains and rely wholly upon the accommodations offered by men with wagons, tents and a roundup outfit for cooking. For those who enjoy nature untamed, a trip of this sort is highly recommended. At any town outfits can be secured that are reliable in every way and that will be cared for by experienced men.

YELLOWSTONE NATIONAL PARK.

If all the other resources of Wyoming could fail, the world would still know of her through the Yellowstone National Park.

The Park was discovered by John Colter, in 1807, but its final disclosure to the world was the work of three exploring parties in the years 1869, 1870 and 1871. It was finally reserved as a national park, by Act of Congress, in 1872. It lies in the northwest corner of Wyoming; is sixty-two miles long by fifty-four miles wide. Its control is under the special authority of the Federal Government.

The scenery of the Park is not equaled by anything else in the world. It is too grand, its scope too immense, its details too varied and minute, to admit of even an attempt at its description within these pages. For nearly every form, animate or inanimate, real or fancied, ever seen or conjectured by the imagination, may here be seen. Its colors and blended tints baffle the artist's brush, and language is inadequate for its portrayal. It is here in this vast solitude that one stands in silent awe and feels Nature's exalted, compelling theme thrill his heart, and hears the deep diapason of her mightiest and most mysterious anthem as it swells out into thunder tones or sinks into sweetest, softest melodies. Here, too, is found all in nature that is chastely beautiful, hidden away in some dim-lighted alcove or bower, while all about is the grim-visaged and towering strength of the silent mountain sentinel. The eye is never weary, for the scene is ever shifting, ever becoming more and more beautiful, grand, imposing and impressive. Here all is quiet, rest, beauty, sublimity.

Placed as it is upon the apex of the continent, its seasons are "July, August and Winter." In the summer, July and August, the long imprisoned vegetation bursts into full life and beauty, and in this short period occur the changes which require months in lower altitudes. The average snow-fall, from November to April, is ten feet.

The Park occupies the northwestern corner of Wyoming, extending slightly into Idaho and Montana. It is readily reached from Pocatello, by the Oregon Short Line. From Pocatello to Yellowstone, Mont., is a ride of 159 miles through some of the most interesting country in the Rocky Mountain region. From various points along the line can be seen the Three Tetons, distant some hundred miles, overlooking the southwestern boundary of Yellowstone Park, keeping, as it were, silent guard from their lofty heights over the national gift.

Yellowstone, Mont., is the terminus of the Yellowstone Park Branch of the Oregon Short Line. It is situated at the western entrance to the Park and is only nineteen miles from the Fountain Hotel, Lower Geyser Basin.

From Yellowstone, park tours are conducted by the Monida & Yellowstone Stage Company, which is licensed by, and under direct supervision of, the United States Government. Two, four and six horse Concord coaches with the finest of horses are used. The drivers have been especially selected for the service; they are well informed, and will point out every interesting feature of the Park.

Two companies of United States Cavalry are stationed at Fort Yellowstone. Their duties are to patrol the Park and to prevent the spreading of forest fires and the commission of acts of vandalism.

The modern method of seeing Yellowstone Park has many advantages over the old way. In place of spending seven days as formerly, the trips have been arranged in

THREE POPULAR TOURS.

TOUR No. 1.—From Yellowstone Station, Oregon Short Line, to the Lower and Upper Geyser Basins (Old Faithful Inn) and return to Yellowstone. Two-day trip. Expense, including Monida & Yellowstone stage and Yellowstone Park Association hotels, \$16.25. Two and one-half days from Salt Lake City, two days and one night in the Park.

TOUR No. 2.—From Yellowstone Station, Oregon Short Line, to the Geyser Basins, Yellowstone Lake, Grand Cañon of the Yellowstone, Norris Geyser Basin and return to Yellowstone. Four-day trip. Expense, including Monida & Yellowstone stage and Yellowstone Park Association hotels, \$36.25. Four and one-half days from Salt Lake City, four days and three nights in the Park.

TOUR No. 3.—From Yellowstone Station, Oregon Short Line, to the Geyser Basins, Yellowstone Lake, Grand Cañon of the Yellowstone, Mammoth Hot Springs, Norris Geyser Basin and return to Yellowstone. Five-day trip. Expense, including Monida & Yellowstone stage and Yellowstone Park Association hotels, \$46.25. Five and one-half days from Salt Lake City, five days and four nights in the Park.

Notice.—Look for the Monida & Yellowstone stage agents with red caps. The Monida & Yellowstone Line is the "Red Line" in the Park.

For the season of 1910 the "Yellowstone Special" of the Oregon Short Line will depart from Salt Lake City about 6.30 p. m. and arrive at Yellowstone about 6.00 a. m., connecting with the Concord Coach Line of the Monida & Yellowstone Stage Company for all points in the Park. The hotels of the Yellowstone Park Association, "Fountain Hotel," Lower Geyser Basin; "Old Faithful Inn," Upper Geyser Basin; "Colonial," Yellowstone Lake; "Cañon," Grand Cañon; "Mammoth," Mammoth Hot Springs; with lunch stations at "Thumb Bay," Yellowstone Lake; and at "Norris Geyser Basin," are situated at the most interesting points in the Park. They are modern in every way and connected by telephone and telegraph.

During the Park season, excursion rates are in effect from all points to Yellowstone Park. Apply to any agent of the Union Pacific or Oregon Short Line, who will cheerfully advise cost of tour to and through Yellowstone Park, including rail, stage fare and hotel expense.

All charges demanded from tourists in Yellowstone Park are approved by the Honorable Secretary of Interior.

Tourists have the privilege of stopping over at any of the hotels in the Park without extra charge for transportation. The hotel expense is \$5.00 per day for extra time beyond the regular tour. The agent of the Monida & Yellowstone Stage Company should be given twenty-four hours' notice, that seats in coaches may be reserved on day of departure.

Until the hotel at the western entrance is constructed near Yellowstone Station, all trains will arrive in the morning and depart in the evening. The Oregon Short Line has a dining hall at Yellowstone, operated by the Dining Car Department, that serves excellent breakfast and dinner at moderate prices. Meals at Yellowstone are not included in any Park tickets.

Parties holding Tour No. 1 tickets can arrange with the agent of the Monida & Yellowstone Stage Company, Upper Geyser Basin, for extending their trip to Tour No. 2.

Parties holding Tour No. 2 tickets can arrange with the agent of the Monida & Yellowstone Stage Company at Norris Geyser Basin for extending their trip to Tour No. 3.

If travelers to the Yellowstone Park will select the route via Yellowstone, Mont., for the going trip, they will experience the varying altitudes in passing over that celebrated scenic and historic line, the Union Pacific, and thus become acclimated and receive a preliminary training for the various elevations of the Park.

SUGGESTIONS FOR VISITORS.

Visitors to the Park are reminded that its elevations vary, and that changes in the temperature are not uncommon. The evenings and mornings are always cool, but at midday it is often quite warm.

Aboard the coach, and in the shade of the hotel verandas, wraps will be found comfortable.

The suggestion is made that ladies provide themselves with a sailor hat, felt hat, gauze veil, a mackintosh, linen duster, a heavy wrap, a bicycle (or denim) suit, gloves and heavy shoes.

Gentlemen will find "last winter's suit," a soft hat, mackintosh, linen duster, a medium overcoat, knickers, walking shoes, and a safety razor handy to have along.

Umbrellas are "not bad" among the geysers.

The rules of the Park as to hunting and fishing are strict, but as yet few regulations have been interposed to the use of the rod. Ladies enjoy trout fishing in Yellowstone Lake, where row boats and guides are easily obtained.

As the United States has sole and exclusive jurisdiction over the Park, its protection and improvement are under the direction of Government officers. Fort Yellowstone, located at Mammoth Hot Springs, is a two-troop cavalry post. The commanding officer is the acting Superintendent of the Park. The United States Commissioner who has civil jurisdiction of all crimes and offenses committed within the Park, is

stationed here. There are also ten outposts throughout the Park, at each of which are stationed a non-commissioned officer and a small squad of men, who patrol the entire area of the Park both summer and winter.

All roads are constructed and kept in repair at the expense of the Government. The road leading south from Mammoth Hot Springs, at Norris Geyser Basin, twenty-miles from Mammoth Hot Springs, intersects the belt line, which describes a circle of 100 miles and upon which are situated nearly all the most prominent points of interest. Twenty miles of the 100 can be covered by steamer across Yellowstone Lake if the traveler so elects, for an extra fare of \$3.00.

The English language is rich in adjectives and all have been brought into service but failed to picture the Park. In spite of the attempts of the word-painter it has not been described. Each one must see for himself to appreciate the generosity of Mother Nature, who has here planned entertainment for every mood of every character. The poet may find his theme, the artist an inexhaustible supply of studies, the scientist a rich field of work. The lover of the grotesque will linger in the hoodoos. The mud geyser will satisfy a craving for the horrible. Spluttering pools and boiling springs will testify that the stokers of the lower regions are never off duty. The geysers bear a family resemblance to one another, but each has an individuality in cone and action. The Grand Cañon with its many-hued walls might alone invite the world to be its guests. Fish are waiting to be caught, but deer and other game seem to realize that they are the wards of the Government, and only pose for the admiration or the camera of the visitor. Bears never fail to furnish after dinner amusement at the hotels.

A complete description of the Park and a full bibliography of its literature can be found in a volume by Captain H. M. Chittenden, U. S. A., entitled "The Yellowstone National Park."

THE FAUNA OF WYOMING.

There are upwards of sixty species of mammals in the State, but the most of these are small. The following are a few of them: Rabbits, several species, of which the cotton tail, snow shoe and jack are the most common; skunks at the lower elevations, woodchucks, wolverines, porcupines, prairie dogs, wild cats, lynx, mountain lions, mink, otter, martins, muskrats, beaver, badgers, red, gray, cross and silver gray foxes, gray wolves, coyotes, swifts, weasels, black footed ferrets, squirrels, ground squirrels, brown, black and grizzly bear, black and white tailed deer, elk, antelope, mountain sheep, a few moose and possibly there may be a few buffalo in the Yellowstone Park.

There are 288 known species of birds in the State. The ducks are numerous and a great many breed. Geese are also common and breed. There is an abundance of sage hens upon the plains and grouse in the mountains. In all there are a half dozen species of grouse in the State. All of these are choice eating. Besides the above mentioned game birds there are numerous plovers and snipes.

HUNTING AND FISHING LAWS.

For many years game was killed for food purposes at all seasons and in unlimited quantities, but recent legislatures have enacted stringent laws for the protection of fish and game animals. Game fish may be caught only by means of rod, line and hook during May, June, July, August, September and October, but no more than twenty pounds of game fish may be in the possession of any one person or party at any time. No trout or black bass less than six inches in length can be legally caught. No game fish can be offered for sale or shipped from the State. The State Fish Commissioner may permit seining in lakes which have been stocked with lake trout, whitefish or carp.

Trout-fishing may now be enjoyed in every part of the State. Snake River, North Platte, Laramie and Big Horn Rivers furnish the best of fishing, while the smaller tributaries are filled with brook trout. Under the direction of the Fish Commissioner over 10,000,000 fish fry have been distributed in the waters of the State, and almost every stream has been stocked. Brook trout weighing five pounds and rainbow trout weighing ten pounds are caught in the Platte River near Saratoga.

Grouse and prairie chickens may be shot from August 15th to December 1st of each year; sage chickens from July 15th to October 15th; snipe or other wader, or plover, duck, brant and geese may be shot from September 1st to May 1st.

A bona fide citizen of the State of Wyoming may hunt, during the open season, within the limits of the county in which he is an actual resident, without the payment of a gun license. Upon the payment of one dollar to any justice of the peace, he is entitled to a gun license, which will permit him to hunt in any county in the State. It is not necessary to have a gun license to hunt game birds. Non-residents must pay forty dollars for such gun license and must be accompanied by a qualified guide when hunting in the State of Wyoming. During the open season licensed parties, as before specified, shall be permitted to kill two elk, two deer, three antelope, one mountain sheep and one mountain goat, between September 1st and December 1st. The barter or sale of any part of the animals above mentioned, or the possession of more than the specified number, is prohibited, under penalty of heavy fine or imprisonment.

Any competent person, who is a bona fide citizen of Wyoming, upon the payment of ten dollars to any justice of the peace, is entitled to receive a certificate as guide, and must act as ex officio assistant game warden, and be responsible for any violation of the law by any person in the party under his guidance. No person shall act as guide for pay without procuring a guide's license.

Game killed by licensed hunters may be shipped from the State, upon a certificate from a justice of the peace, stating that such animals were killed according to law. It is unlawful to sell any part of any wild animal, hides or horns, or to use dogs for the purpose of coursing or running the animals above mentioned.

A pamphlet copy of the compiled game laws of Wyoming will be forwarded upon application to the Secretary of State.

DUCKS, GEESE AND GROUSE.

As soon as the ice leaves the lower portions of the streams and lakes, swarms of ducks and many geese enter the State from the south and remain for at least a month, when the majority will pass on to the northward. During this stay there is excellent shooting about all ponds and lakes that are less than 8,000 feet above the sea. One of the most celebrated localities is the Laramie Plains, where there are numerous small ponds and a few small lakes. Twelve miles southwest of Laramie (Hutton's and Creighton's lakes and the surrounding country) is always good hunting, and it is not an exceptional case for four men to go out and bring home upwards of 200 ducks for two day's shooting. The ducks are of many kinds, red-heads, mallard, pin-tail and canvas-back being the common early kinds, which are followed by teal, bald pate, scaup, widgeon, mallard and many other varieties. Goose hunting is best in the fall, when the geese are staying about ranches where grain is raised. While this sport is not largely indulged in, there are a few hunters who make a practice of bringing in a big bag of game each season.

Grouse hunting is divided into three or four kinds. The earliest is the sage hen, which lives upon the plains and deserts, where there is some water. When the law is out on July 15th, the young birds are half grown, and make excellent shooting, and also are fine eating. They are to be hunted about springs or along small streams that have an elevation of less than 8,000 feet. They are rather logy birds and easily taken with fine shot.

The sharp-tail grouse lives at a much lower elevation than the sage hen. The country about the lower Platte and about the base of the Black Hills abounds in these quite gamy birds that are also found in good-sized coveys near by the water courses. The open season commences on August 1st for this variety. Besides these there are two varieties of dusky grouse and two varieties of rough grouse. These are mountain birds. The dusky grouse live largely about spruce timber and are often seen above the snow line. They are abundant, but not gamy, for one will often sit upon a limb of a tree and let a hunter shoot a half dozen of its companions without being disturbed. These are found in all of the mountain ranges. Their flesh is light colored but a little dry. Of all the grouse family in the State this is the most highly flavored. The rough grouse are largely confined to the northern half of Wyoming, but are also known in the southwestern corner. They resemble the rough grouse of the East in every way and make an inviting dish. On account of these birds being a long way from railroad points they are hardly known to the western hunters of small game; but eventually they will become of more importance to the sportsman than any other game bird of the State.

FISHING.

If there is one sport above another that a man enjoys, it is good fishing. Not the fishing of the average stream or lake, where he may and he may not, more often the latter, get game; but waters to fish in where he always finds sporting fish and an abundance of them. The majority of people have to leave

home to go fishing, and it too often happens that a wind or a storm plays havoc with their sport after they are upon the ground. Not so in fishing in the mountain streams for trout. To be sure a cloudburst, which is seldom seen, might put a stop to the sport for a few hours, but not longer, and the sportsman can renew his efforts and become more than paid for his rest. When one goes fishing in Wyoming, that is if he is a fisherman, he always returns with a basket of fish, and often has to stop before the noon hour because he has caught his allowance, according to the law, which is 20 pounds.

Both the Little and Big Laramie Rivers are easily accessible from Laramie. In fact, there are trout for at least twenty miles below Laramie, which is on the river, and for fifty miles above. In this stream there are all kinds of trout; the most of them being Rainbow, but there are also German Brown, Brook and a few natives. Usually the fishing is best above Laramie; but it is often good at that place. It is a common thing for fishermen to go out on their wheels in the morning and return well loaded in the evening. Some take the stage, which runs daily, and stop at some of the resorts which vary from 20 to 26 miles from town. At these places one can secure a good room and excellent board for \$1.50 or more per day, and reside upon the river. The fish in the stream are plentiful; there are some very large ones, while the average will weigh over a pound. In fact, it is just the kind of fishing to please most people. There are other places where one can find accommodations above the ones just mentioned; but the most of the sportsmen hire an outfit and camp out just where they desire. Fishing lasts the entire season on the Laramie River. The following is a list of some of the flies that take well: Coachman, light, dark and royal, brown and gray hackles, professor, queen of the waters, jungle cock, abbey, black gnat and cowdung.

All of the tributaries of the Big Laramie afford good brook trout fishing, but the largest fish remain in the large stream. The Little Laramie, where the fishing commences, is about twenty miles west of Laramie. The road is good for a bicycle, or one can go out upon the daily Rambler stage and put up at some of the ranches or the stage station. Otherwise one would have to arrange to camp out. Besides the main stream there are three tributaries that abound in trout. This stream being smaller than the Big Laramie, does not produce as many large fish, but there are plenty varying from one to two pounds to be caught at the foot of Sheep Mountain. Above the junction of the different forks the fish are much smaller; but they will average above eight inches in length. The Centennial Valley has always been a standby for fishermen since the stream was first stocked. It is a beautiful spot, almost hemmed in by the mountains, and offers exceptional opportunities for those who wish to combine the delights of a camping trip with a glorious fish.

CAMPING.

Where to go is the point to be considered. Wyoming offers exceptional advantages for people wishing to camp. On the north and south of the Union Pacific Railroad there are mountain ranges varying from twenty to forty miles from town or city, and any of these will be found pleasant

and enjoyable. One can outfit from Cheyenne and go to the Poudre country or Dale Creek or Cheerakee Park. From Laramie one can reach the Medicine Bow Mountains, the Laramie Peak country and numerous spurs to these ranges. Good camping grounds are within a day's drive from Laramie. One can also outfit from Walcott, Hanna, Rawlins, Rock Springs, Green River, Carter and Evanston. There are many responsible parties to be found in each place who can give full details of the country and who will recommend responsible men to act as teamsters or camp hands.

In arranging for a camping trip to the Wyoming mountains it will be best for you to get together your equipment and ship it by freight at least ten days before you start. The equipment should consist of proper tents, camp stoves, beds and such other things as may suit the traveler. If you decide to go to Laramie, you will always find men with teams that can be hired by the day to accompany you, or you can hire them to take you to your camping ground, and arrange for them to return at a certain time and take you back to town. The latter way is inexpensive, and if you can care for your camp it will be as well to hire teams for the entire trip. Some wish to move about in the place of staying in one place, and when this is done it will be necessary to have a team hired for the trip and possibly several of them, depending upon the size of the party. Men and teams can be had for about \$4.00 to \$5.00 per day. It is not an unusual thing for a half dozen families to join in a camping party, which usually adds much pleasure to the outing.

HOT MINERAL SPRINGS.

The State abounds in warm and hot springs and many of them have already been proven to be of superior medicinal importance. This work has been done without the aid of a railroad, for all of the hot springs so far as tested are from 25 to 150 miles from any completed line. Besides the numerous hot springs in the Yellowstone Park there are the following that have been reported: Stinking Water near Cody, Thermopolis, Shoshone at Fort Washakie, Beaver Cañon above Hailey, Horse Creek north of Independence Rock, Alcova, Warm Spring south of Guernsey, and Saratoga. Of these permanent bathing resorts are maintained at Thermopolis, Cody, Alcova and Saratoga. All of these are reported as excellent for all diseases that hot springs can cure. Some of the most marvelous cures have been perfected. It is not an uncommon thing for poor people to haul their friends two and three hundred miles in a covered wagon that they may bathe in these marvelous waters. As soon as these springs are connected by rail with the outside world they will receive a thousand times the attention they do to-day and will equal if not surpass the most celebrated warm spring resorts of the entire world. The cures that have been recorded up to the present time warrant this assertion. People needing treatment of this kind can not afford to overlook the mineral springs of this State.

ANALYSIS OF THE THERMOPOLIS HOT SPRINGS.

	GRAMS PER LITER.	GRAINS PER GALLON.
Silica.....	.0855	4.986
Iron and Alumina.....	.0039	.227
Potassium chloride.....	.1756	10.240
Sodium chloride.....	.4492	26.195
Sodium sulphate.....	.2591	15.110
Magnesium sulphate.....	.3334	19.443
Calcium sulphate.....	.2256	13.156
Calcium carbonate.....	.6937	40.454
Total solids.....	2.2260	129.811

ANALYSIS OF THE SARATOGA HOT SPRINGS.

	GRAMS PER LITER.	GRAINS PER GALLON
Silica.....	.1264	7.371
Iron and Alumina.....	.0030	.174
Potassium chloride.....	.0414	2.414
Sodium chloride.....	.8613	50.228
Sodium sulphate.....	.4650	27.117
Magnesia sulphate.....	.0213	1.242
Calcium sulphate.....	.2023	11.797
Calcium carbonate.....	.1239	7.226
Total solids.....	1.8446	107.569

ANALYSIS OF ALCOVA HOT SPRINGS.

	GRAMS PER LITER	GRAINS PER GALLON
Silica, SiO ₂.....	.0397	2.315
Iron and Alumina, Fe ₂ O ₃ , Al ₂ O ₃.....	.0022	.128
Potassium chloride, KCl.....	.0251	1.464
Sodium chloride, NaCl.....	.4706	27.443
Sodium sulphate, Na ₂ SO ₄.....	.0771	4.496
Magnesia sulphate, MgSO ₄.....	.2971	15.326
Calcium sulphate, CaSO ₄.....	.2438	14.217
Calcium carbonate, CaCO ₃.....	.2278	13.285
Total solids.....	1.3834	80.674

ANALYSIS OF CODY HOT SPRINGS.

Total solids—4.6392 grams of 96.65 grains per gallon
Analysis of solids.

Carbonic acid (combined).....	17.670	per cent.
Sulphuric acid (combined).....	24.362	"
Calcium oxide.....	29.431	"
Magnesia oxide.....	5.180	"
Iron and aluminum oxides.....	0.521	"
Lithium, sodium, potassium, oxides and chlorides.....	6.179	"
Organic matter.....	1.160	"
Water of combination.....	12.332	"
Moisture.....	3.201	"
	100.000	

FORESTRY AND LUMBER

INDUSTRY AWAITS RAILROADS.

There are many extensive forests in the State. All of them are a long way from the railroad, and with the exception of working them for ties and

mining timbers, no company has considered doing more than manufacturing lumber for domestic purposes. Until a few years ago the general government has allowed the mill man to enter public domain and cut lumber, unrestricted, for the benefit of the surrounding country. Now arrangements have to be made, where the forests are available, with the proper officer and stumpage paid. To a small degree some have taken advantage of the timber and stone act and have purchased small holdings of timber lands, so that they may enjoy the privilege of selling lumber as they see fit. As a rule the most of the lumber utilized in the State is cut by small mills upon the mountain sides and hauled by wagon to the town. Manufacturing ties for the railroad companies has always been quite an industry, for the ties could be made upon the mountain and in the spring driven to the railroad which was often fifty or more miles away.

On account of such vast areas being set aside as forest reserves, the manufacturing of ties will be hampered seriously unless some arrangements can be made with the general government whereby the old and mature trees can be removed to give place for the young ones.

The amount of land covered with forests has never been surveyed, and any estimate that has been made is of the roughest character and can not be considered as having much practical value. There are thousands of acres covered with stunted pine trees, that from a distance look like a forest, but upon inspection they are found to be of no value unless it be for fire-wood. Again, a vast amount of the valuable forests of the State has been consumed by fire during the last quarter of a century. It is not an uncommon thing for a fire to destroy many thousand acres of valuable timber in a short time. There are at present thousands of acres of down timber in all of our mountains that act as a fire-trap, since the burned or killed trees are all dry, and when fire starts in them it means a serious blaze, and furthermore it means that the tract swept over by a second fire becomes a barren waste, where trees will not grow.

The largest forests of the State are found on the Big Horn, Absaroka, Shoshone, Wind River, Gros Ventre, Salt River, Sierra Madre and Medicine Bow Mountains. There are forests of less importance upon the Laramie, Shirley, Ferris, Green, Bear Lodge and the Black Hills. With the exception of the Black Hills region and Bear Lodge Mountains, the forests range from 8,000 to 10,000 feet. In the previously mentioned places the forests are largely pitch pine and range from 4,000 to 6,000 feet. It should also be noted that in Crook County, oak trees thrive and there are many that have a diameter of from two to three feet. Associated with the forests of the lower elevations are various kinds of cottonwoods, birch, ash and box elder. In the higher mountains the most abundant wood is the lodge-pole pine, which grows to a considerable height, is straight and makes saw logs from a foot to eighteen inches diameter on the average. From 9,000 to 10,000 feet, in localities where the country is marshy, the white spruce grows to a considerable size. These trees are often over a hundred feet in height and three to four feet through at their base. The spruce is cut as lumber, but is not manufactured into railroad ties. In a few localities in the State, the red spruce is common and it grows to a great size. This is extremely valuable for railroad ties and posts

and makes excellent lumber. There are other species of pine, but they are usually scrubby and do not make valuable lumber. There is also a species of balsam that is absolutely worthless for anything.

The forest is rapidly becoming of great value in the West. Not only is it valued for the retention of snow to increase the flow of the streams; but the shortage of eastern lumber makes the mountain districts appreciate their forests though the trees are small. Great demands will be made upon the forests of the West in the near future. The miner must have timber for his mine, the railroad must have ties and the citizens lumber for construction, and at the same time the forests are to be made permanent for the benefit of the agriculturist. Just laws for handling the great forests are needed at this time, not only that they may be protected properly, but that the old trees may be removed and the underbrush, which is so detrimental in case of fire, may be cleared away, and at the same time give ample timber to carry on the industries of the West.

CLIMATE AND HEALTH

THE CLIMATE OF WYOMING.

BY W. S. PALMER, SECTION DIRECTOR, UNITED STATES WEATHER
BUREAU, CHEYENNE.

The surface of the State of Wyoming consists, in general, of a vast undulating plateau, the greater portion of which is from 5,000 to 8,000 feet above sea level; this plateau is broken by several detached mountain ranges which form a portion of the main chain of the Rocky Mountains. Some of the lower portions of the State are less than 4,000 feet above sea level, while Fremont's Peak and the Grand Tetons rise to the region of perpetual snow, more than 13,000 feet above sea level. This diversified topography of the State produces a diversified climate, although there are many climatic features which are common to all portions of the State. Local conditions are more pronounced over Wyoming than over the broad level areas of the Mississippi Valley where the general drift of the air currents are in no wise obstructed by topographical features.

TEMPERATURE—The mean temperature of the different sections of the State varies from 34° to 47°, the former mean obtaining only at such places as are located at high elevations or in cold valleys. Situated as Wyoming is in what is known as the "sub-arid belt," the daily range of temperature is much greater than in the humid States; and the intensity of the sunlight, due to the clear and rarefied atmosphere, makes a marked difference between the temperature in the sun and in the shade. At stations above 6,000 feet, temperatures rarely rise above 95° in the summer; below 5,000 feet, where temperatures of 100° may be experienced, the heat is not oppressive and sunstrokes are practically unknown. The dryness of the atmosphere, which prevents sunstrokes in summer, also tends to ameliorate the effects on man and beast of the extremes of cold during the winter. Over much of the State, the temperature during the winter seldom falls below 25° below zero, and the cold waves which sweep over the State are of short duration; in fact, in most parts, the winters are unusually pleasant and out-of-door work can be carried on with little discomfort.

PRECIPITATION—The normal precipitation for the State varies from eight to twenty inches, the average being about thirteen inches. Over portions of Sweetwater and Big Horn Counties, the yearly average is probably less than ten inches, while over portions of the high mountain regions, the extreme northwest and northeast sections, the average may exceed twenty inches. Over nearly all of the agricultural sections the average is from twelve to fifteen inches. The distribution of this precipitation throughout the year is advantageous for agricultural interests, as about 75 per cent of the total yearly amount falls during the six summer months. The snowfall is not heavy, except in the mountains, and the plains are bare enough most of the winter to allow stock to feed on the nutritive grasses which have been cured on the ranges.

SUNSHINE—The percentage of sunshine in Wyoming is high, and its intensity, by reason of the unusually clear skies and the altitude of the State, is an important fact to be considered, either from an agricultural or a physiological standpoint. Other conditions being the same, that plant will make the most rapid progress and development which receives the greatest amount of sunlight. To this feature of the climate is largely due the rapidity of the growth of vegetation during the bright sunshine of the summer months.

It is the high percentage of sunshine of this region and the absence of the damp weather and drizzling rains that make the State an unusually favorable place for the invalid to recover his health and strength. During the summer out-of-door life can be indulged in by the invalid, and the many mountain and valley resorts make ideal places for that kind of a life which is almost sure to restore health and strength. While the cold weather of the winter will prevent life in the open some of the time, there are only a few days during which a patient can not enjoy the pure and bracing atmosphere of the region in the bright sunlight. As some one has truly stated, the invalid who comes to Wyoming for a winter is not coming to a climate of balmy warmth, but rather, and better, to one where the bracing cool air is flooded for more than three-fourths of the day time with bright sunshine.

The following by Dr. Clinton Wagner in reference to Colorado is justly applicable to Wyoming:

“In describing a climate which presents so many anomalies, the dryness of an inland desert, the cool, bracing air of the far north, an atmosphere so clear that mountains 130 miles distant can be seen distinctly without the aid of a glass, the sun of the tropics, a sky that surpasses that of Italy in loveliness, and scenery which excels that of Switzerland, one may justly stand in dread of being charged with indulging in language of the imagination, yet it is all true. From September till the latter part of April little or no rain falls; there are no fogs, no mists.”

SUNSHINE AND BLUE SKY.

BY DR. M. C. BARKWELL, MEMBER OF STATE BOARD OF MEDICAL EXAMINERS.

Wyoming has superior climatic advantages. Remote from the seacoast and large bodies of water, there is but little fog or rain, and the general prevalence of sunshine renders the atmosphere dry, rare and clear. Cloudy days are the exception. Objects are seen at great distances, and the atmospheric influence on the human system is bracing and healthful.

There is no region of equal area that is possessed of more abounding and diversified richness of resource and possibility. It is almost as limitless in undeveloped opportunities as it was when Bonneville first broke his way into Jackson Hole—now the wonderland of the United States. Much more in praise of the richness of this young commonwealth could be given without vain repetition or exaggeration. The climate of this region of mountains, plains, parks and valleys, of this land of sunshine, azure sky, and bracing and tonic air, calls for a more wide-spread appreciation than now prevails. From what has been said of the physical features of Wyoming, variety of climate would be expected. On the mountain peaks, 13,000 feet above sea level, perpetual snow abounds. In the lower valleys apples, grapes and smaller fruits are grown. Three things are common to all of Wyoming—*dry air, sunshine and blue sky*. All over the State—except at high altitudes—one may, even in midwinter, sit in comfort in the sunshine in any sheltered corner.

It is the glory of perpetual sunshine which has, perhaps, more to do with the exhilarating effect of Wyoming climate, on both sick and well, than anything else. It is the sparkling, dry air which makes life happier and more satisfactory than it could be under the clouded skies of the East and South. Diminished barometric pressure, small rain-fall, low atmospheric humidity, intense sunshine on account of the dry and thin air, and absence of cloudiness, make this the ideal abode of those suffering from pulmonary troubles.

“In selecting a climate the question of degree of temperature is a minor one. A dry, equable temperature is always preferable. Dry cold is *not* dangerous, and is indeed preferable to enervating warmth.” (Wood and Fitz. “Practice of Medicine.”)

George Burney, M. D., says: “In selecting a climate for a consumptive, the first question which occurs to us is the inquiry as to the proportion of sunny days in which out-door exercise can be enjoyed safely. In the great majority of cases, a dry climate with abundant sunshine and pure air constitutes the desideratum.”

Dr. Weber says: “Setting aside individual peculiarities, the majority of tubercular patients do best at a height of three to six thousand feet.”

Dr. Knight, of Boston, says; “In suitable cases (those in which large cavities are not formed in the lungs) the improvement in nutritive activity is much more marked in mountainous regions than on the plains,” and “four to eight thousand feet is the proper altitude.” In this statement I fully concur, after an experience in treatment of many cases of pulmonary consumption covering a period of thirty-five years.

“I am as sure as I can be that recoveries from phthisis, judiciously treated at high altitudes, are much more numerous and much more lasting than those treated by any other method at any other place.” (Sir Andrew Clark.)

The cases that are most favorably impressed here are—

1. Where the apices are early affected.
2. Those without cavities, although advanced and with consolidation.
3. Recent cases, whose salient symptom is hemorrhage.
4. A non-progressive cavity is benefited.
5. Remaining consolidation after pleurisy and pneumonia.
6. Chronic laryngeal also no worse here than elsewhere.

The clothing worn in Wyoming is such as is commonly worn in the Middle States of our altitude, except that the storm coat is but little used. In summer underwear of medium weight is usually worn.

If one were called upon to select a climate calculated to benefit a patient suffering from a particular malady, it would seem the most rational to select one where that particular disease or class of diseases did not prevail, and as

endemic phthisis has never been known to generate in Wyoming, no stronger argument could be advanced in favor of this being a curative climate.

Resorts of any desirable elevation are within reach. Wyoming presents equally favorable climatic influences for the restoring of those invalidated by bronchial maladies and catarrhal states of the throat and naso-pulmonary air passages as it presents for the cure and alleviation of tuberculosis.

This is the region *par-excellence* for asthmatic people. Many hundreds of people of all ages, thus afflicted, have come here from low altitudes of the East and West, have been restored to health and vigor, and to-day are some of the most active and prosperous of our citizens.

Our altitude does not militate even against those who have valvular disease of the heart, unless where compensation is destroyed, and accompanied by dilatation and weakness.

My observation has been that patients do equally well at advanced age, and are as uniformly benefited in this altitude (6,041 feet) as those who are younger. What is true of the heart applies as well in regard to pneumonia, bronchitis and pleurisy, which diseases are extremely rare here, and the percentage of deaths much smaller than in any other State in the Union.

Chronic laryngitis and bronchitis are speedily cured by residence, unless they exist as complication of advanced stages of consumption. Persons whose habits of life do not allow or compel them to fully expand their lungs in a pure atmosphere; pale, anæmic clerks, those of sedentary habits, with hacking coughs; nervous and dyspeptic people; children with narrow stooping shoulders and flat breasts, with impaired digestion, should come to these mountains, if possible, as the air of this region necessitates full breathing; every cell in the lungs is forced into activity, straightening the form, increasing the breathing area and hurrying the blood, thus purified, freely through the lungs.

The choice of climate for the patient is the most important part of the treatment. Usually the first decision made is whether the patient shall or shall not go away from home. The proper rule is, the milder and apparently more insignificant the local disease, the more important the seeking out of a suitable climate, because the more is to be hoped from climatic treatment. If, with the involvement of each lung, there be present softening and formation of cavities, change of climate only can be expected to give relief. Such cases—except where softening is of limited extent—should not be brought to these high altitudes, as the fatal termination is only hastened by so doing.

Chronic diseases peculiar to women do well. Those suffering from general debility and nervousness are almost certain to be cured by a residence here for a sufficient length of time.

WEATHER STATISTICS.

The following climatic tables have been compiled from the records of the Weather Bureau, and show the monthly weather conditions which have existed over southern Wyoming during the last ten years, together with the mean monthly and annual temperatures and precipitations at the stations given. Their elevations are as follows: Cheyenne, 6,084 feet; Evanston, 6,860 feet; Laramie, 7,188 feet; Pine Bluffs, 5,038 feet.

MONTHLY AND ANNUAL MEAN TEMPERATURE, CHEYENNE.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	25.3	12.4	26.6	41.6	49.4	60.1	65.6	64.4	59.4	43.4	40.2	29.4	43.2
1900	31.0	24.3	35.8	40.2	54.8	65.4	64.9	67.4	56.2	48.0	37.4	31.7	46.4
1901	29.4	22.6	31.8	40.2	53.7	60.0	71.4	67.3	56.4	48.0	40.0	26.2	45.6
1902	25.5	31.2	31.1	41.6	52.8	61.0	63.8	67.0	54.0	47.8	35.8	28.6	45.0
1903	29.4	15.8	32.0	40.0	48.0	56.9	66.8	66.1	53.8	47.1	36.6	32.1	43.7
1904	25.4	34.0	35.2	41.5	49.2	57.2	63.2	65.5	58.0	46.8	40.7	30.9	45.6
1905	23.7	20.2	37.6	37.3	47.2	61.6	63.8	66.8	58.7	40.6	37.0	27.6	43.5
1906	30.8	29.6	23.7	43.2	51.0	57.9	62.9	64.7	57.0	44.2	32.0	35.6	44.4
1907	28.3	35.0	40.2	39.3	45.4	58.1	66.3	65.3	56.8	48.0	34.0	29.2	45.5
1908	28.0	29.7	39.2	44.2	47.8	57.9	65.0	63.2	59.1	43.0	32.2	28.6	44.7
Mean	25.6	26.3	33.0	41.6	51.0	61.5	67.4	65.8	57.2	45.3	34.9	29.0	44.9

MONTHLY MAXIMUM TEMPERATURES, CHEYENNE.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	55	47	60	72	76	93	91	88	89	80	65	58	93
1900	59	52	69	69	81	92	90	92	85	74	67	58	92
1901	56	53	62	79	77	90	95	93	82	72	66	57	95
1902	59	57	58	74	82	92	93	94	86	77	67	56	94
1903	53	45	62	71	77	88	89	90	87	75	67	56	90
1904	56	63	62	72	77	80	87	87	87	74	67	64	87
1905	51	63	63	73	77	88	88	89	86	81	66	58	89
1906	61	60	63	74	77	88	88	88	85	78	62	60	88
1907	58	62	74	72	80	83	91	88	82	76	64	61	91
1908	51	64	68	75	81	85	89	89	89	74	69	52	89

MONTHLY MINIMUM TEMPERATURES, CHEYENNE.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	— 6	—28	—16	11	24	36	45	39	29	19	14	4	—28
1900	—13	—12	9	6	25	40	39	45	29	16	5	—18	—18
1901	— 9	— 9	3	8	31	35	44	47	30	28	12	—22	—22
1902	—27	—12	7	9	28	37	40	47	22	26	9	5	—27
1903	0	—20	2	4	24	30	40	40	20	21	— 5	1	—20
1904	— 2	5	— 1	15	26	36	37	39	29	19	7	— 2	— 2
1905	—20	—30	15	12	25	42	42	44	36	5	0	3	—30
1906	— 6	— 9	—17	16	27	33	39	43	33	16	1	13	—17
1907	2	— 9	7	15	8	36	43	40	30	25	0	0	— 9
1908	—13	—14	9	7	23	40	36	41	16	15	— 7	2	—14

MONTHLY AND ANNUAL PRECIPITATION, CHEYENNE.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	1.23	1.63	1.89	0.97	1.70	0.74	3.28	1.15	0.07	1.27	0.07	0.18	14.18
1900	0.15	1.25	0.72	7.66	0.76	1.01	1.20	0.70	2.19	0.03	0.09	0.33	16.09
1901	0.13	1.10	1.54	2.97	2.47	1.93	1.34	0.83	0.75	0.31	T	1.62	14.99
1902	0.21	0.55	2.11	1.49	2.51	1.55	1.49	0.53	3.52	0.52	0.23	1.79	16.59
1903	0.20	1.76	1.00	2.10	0.46	1.42	0.79	1.90	1.40	0.34	0.79	0.09	12.25
1904	0.35	0.33	0.45	1.80	6.66	1.78	2.00	0.87	0.83	0.57	0.02	0.06	15.72
1905	0.84	0.69	1.27	6.45	4.01	1.90	2.97	1.93	1.06	1.40	0.11	0.02	22.68
1906	0.21	0.21	2.27	3.10	1.30	2.42	1.89	0.49	1.86	2.33	1.42	0.15	17.65
1907	0.42	0.49	0.49	1.32	2.78	0.34	3.56	0.80	0.92	0.18	0.59	0.55	12.34
1908	0.36	0.20	0.16	0.36	6.19	2.52	4.33	2.45	0.09	1.14	0.59	0.70	19.09
Mean	0.40	0.56	0.95	1.85	2.43	1.57	1.99	1.47	0.94	0.72	0.41	0.31	13.60

MEAN MONTHLY TEMPERATURES, EVANSTON.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	19.6	16.1	25.4	37.2	42.7	53.6	62.9	57.6	56.0	36.9	33.7	16.6	38.2
1900	24.4	17.4	33.9	37.2	48.5	59.0	60.3	58.5	49.4	39.6	31.4	21.8	40.1
1901	17.6	24.4	25.8	36.4	50.4	52.0	64.6	62.9	49.4	43.9	34.5	23.2	40.4
1902	20.1	28.0	23.6	37.7	46.6	55.2	57.6	59.2	52.0	42.4	30.2	20.8	39.4
1903	22.0	9.1	25.2	36.8	44.6	56.0	59.4	61.7	49.5	43.3	31.4	22.9	38.5
1904	16.9	25.3	27.8	39.8	46.6	52.4	59.8	60.2	53.0	43.5	36.0	24.0	40.4
1905	24.6	21.5	34.6	39.8	44.4	54.6	61.0	62.0	53.6	37.6	32.6	16.6	40.2
1906	19.4	20.0	25.0	39.8	45.9	51.4	61.8	60.0	53.8	42.2	28.2	26.7	39.5
1907	21.6	30.2	33.2	40.5	44.0	50.0	61.1	58.7	52.0	46.6	32.8	22.7	41.1
1908	17.9	19.6	31.4	41.2	44.0	49.9	63.2	60.2	52.7	36.8	29.6	22.1	39.0
Mean	20.4	21.3	28.7	38.7	45.9	53.7	61.8	61.1	53.0	41.9	31.8	20.7	39.9

MONTHLY MAXIMUM TEMPERATURES, EVANSTON.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	38	42	53	68	73	84	89	82	82	70	59	45	89
1900	45	38	60	67	77	88	92	87	82	66	58	43	92
1901	45	50	53	68	79	80	93	88	78	74	58	47	93
1902	48	50	42	67	76	85	88	89	83	74	61	50	89
1903	43	40	52	69	76	82	87	90	83	70	62	49	90
1904	42	49	49	70	72	80	86	87	85	73	61	51	87
1905	51	48	55	65	74	79	87	88	85	73	65	47	88
1906	41	48	49	69	73	83	87	87	79	77	59	48	87
1907	48	51	60	67	74	74	84	85	77	75	65	55	85
1908	44	50	56	71	70	78	86	89	85	69	62	46	89

MONTHLY MINIMUM TEMPERATURES, EVANSTON.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	— 7	—30	1	10	18	20	35	27	28	11	11	—23	—30
1900	0	—15	12	18	24	31	34	32	18	10	0	—19	—19
1901	—14	—16	— 2	4	25	20	31	38	19	25	7	—14	—14
1902	—21	— 4	—10	11	18	26	28	29	19	18	— 2	—12	—21
1903	—10	—34	—11	8	19	33	29	28	18	12	—10	— 3	—34
1904	— 8	—20	— 6	18	22	24	33	27	24	20	9	—20	—20
1905	— 9	—38	7	15	21	29	35	36	22	— 3	— 7	—15	—38
1906	—15	— 5	—22	16	12	26	38	35	28	— 3	—10	—10	—22
1907	— 4	— 1	2	12	20	27	32	27	22	25	12	—16	—16
1908	—14	—20	— 8	6	20	28	38	24	18	7	—17	—17	—20

MONTHLY AND ANNUAL PRECIPITATION, EVANSTON.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	1.48	2.10	5.12	1.83	2.09	0.18	0.51	0.73	0.04	2.87	0.89	1.75	19.59
1900	0.30	1.33	0.11	2.23	0.85	0.30	0.37	0.52	1.60	1.39	2.13	0.35	11.48
1901	0.53	1.82	0.86	1.28	1.97	0.22	0.82	1.00	0.13	1.82	0.75	1.81	13.01
1902	0.57	0.73	1.24	1.86	1.25	0.76	1.08	0.21	1.00	0.40	0.58	0.84	10.52
1903	2.14	0.80	0.44	1.22	1.51	0.19	1.18	0.05	0.76	0.87	1.62	0.30	11.08
1904	0.53	1.56	2.60	1.13	2.88	0.80	0.47	1.91	0.05	1.23	0.00	0.53	13.69
1905	0.27	1.45	1.72	1.71	0.86	0.32	0.84	0.71	1.48	0.30	0.15	0.32	9.13
1906	1.37	1.02	2.26	1.45	4.51	1.72	0.38	2.51	0.97	1.24	1.19	1.04	19.66
1907	1.38	1.76	1.95	1.03	2.71	2.49	0.07	1.50	0.57	1.22	0.05	1.38	16.11
1908	0.54	0.45	1.33	0.46	2.01	2.04	0.73	1.31	2.47	1.82	0.44	0.42	14.02
Mean	0.90	1.17	1.56	1.28	1.99	0.97	0.60	0.96	0.93	1.19	0.82	1.36	13.73

MONTHLY AND ANNUAL MEAN TEMPERATURES, LARAMIE.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	20.6	9.4	24.4	38.3	44.8	55.1	62.2	60.7	55.2	38.4	35.6	18.2	38.6
1900	25.5	19.6	32.2	36.0	50.8	61.5	62.8	62.4	52.1	45.2	37.1	25.6	42.6
1901	19.2	19.4	26.6	34.9	49.8	53.6	67.8	62.6	52.4	44.4	37.1	21.2	40.8
1902	22.2	29.0	27.5	38.6	49.0	58.0	59.8	62.2	51.5	44.4	32.6	24.0	41.6
1903	23.3	11.4	29.3	37.5	43.9	53.9	62.6	63.4	51.2	43.4	34.8	26.4	40.1
1904	20.2	29.7	32.0	39.1	46.8	54.0	60.6	61.4	54.4	43.0	35.4	26.2	41.9
1905	22.7	15.6	34.6	35.6	44.7	58.4	61.4	63.0	55.0	37.4	33.0	22.2	40.3
1906	24.2	27.5	24.8	39.8	47.4	55.0	60.4	61.6	53.6	40.3	29.0	30.4	41.2
1907	24.7	32.8	36.1	37.1	42.0	53.4	62.6	61.5	53.8	44.3	30.0	23.4	41.8
1908	22.2	24.4	33.8	41.8	44.6	54.4	61.4	60.2	54.8	39.6	25.5	23.4	40.5
Mean	21.8	21.6	28.9	37.8	46.6	55.9	62.2	61.7	53.5	41.7	31.5	22.9	40.5

MONTHLY MAXIMUM TEMPERATURES, LARAMIE.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	46	43	52	65	72	87	87	83	85	72	59	48	87
1900	50	44	63	65	78	91	89	89	81	70	62	49	91
1901	48	48	56	70	74	85	92	86	79	72	62	50	92
1902	52	54	52	69	75	87	89	91	80	71	63	52	91
1903	44	42	58	66	75	84	84	84	82	71	62	52	84
1904	50	56	57	69	73	79	83	84	83	70	61	53	84
1905	47	52	57	67	72	83	91	90	81	73	61	56	91
1906	52	54	58	69	74	84	82	88	81	73	58	56	88
1907	52	55	67	67	73	78	85	84	80	75	61	56	85
1908	45	54	64	69	74	80	84	86	84	71	62	44	86

MONTHLY MINIMUM TEMPERATURES, LARAMIE.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	— 3	—40	—14	12	18	29	40	32	26	8	9	—21	—40
1900	— 7	—19	0	—10	24	34	34	36	27	21	5	—27	—27
1901	—19	—21	— 2	0	29	32	44	41	21	22	11	—23	—23
1902	—18	— 5	3	8	20	28	33	36	17	19	6	— 8	—18
1903	— 3	—26	— 8	1	17	31	36	38	18	16	— 6	— 4	—26
1904	—16	— 3	— 6	13	20	29	32	27	28	7	5	—11	—16
1905	—24	—42	4	0	20	34	33	40	31	— 8	5	— 5	—42
1906	—11	— 4	—21	10	19	26	37	35	30	4	—11	4	—21
1907	— 6	1	2	8	7	31	41	34	24	20	— 7	— 9	— 9
1908	—11	—22	— 1	5	17	32	33	28	14	11	—24	—16	—24

MONTHLY AND ANNUAL PRECIPITATION, LARAMIE.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1899	0.95	1.13	1.11	1.75	0.37	1.11	2.01	1.44	0.17	1.13	0.07	0.61	11.85
1900	0.01	0.82	0.58	2.91	0.24	0.35	1.25	0.61	1.11	0.61	0.06	0.03	8.58
1901	0.04	0.41	0.05	0.28	3.00	1.73	0.32	1.11	0.09	1.28	T	0.21	8.52
1902	T	0.26	0.41	0.80	0.26	0.60	1.49	0.40	1.58	0.74	0.22	0.89	7.65
1903	0.11	0.36	1.09	0.73	1.63	1.00	1.31	0.88	2.39	0.50	0.30	0.07	10.37
1904	0.25	0.11	0.36	0.84	1.74	2.01	1.39	0.93	1.35	0.54	0.04	0.08	9.58
1905	0.39	0.42	0.64	1.21	1.79	0.36	1.79	0.83	1.64	0.53	0.22	0.03	9.85
1906	0.58	0.05	1.01	1.75	0.91	1.71	1.75	0.59	2.09	1.33	0.41	0.39	12.57
1907	0.29	0.15	0.28	0.78	1.09	0.90	3.68	1.28	0.62	0.16	T	0.23	9.46
1908	0.24	0.08	0.02	0.34	5.57	0.84	2.68	1.93	0.65	0.45	0.38	0.35	13.53
Mean	0.26	0.30	0.80	1.11	1.65	1.13	1.58	1.08	0.97	0.77	0.25	0.31	10.21

MONTHLY AND ANNUAL MEAN TEMPERATURES, PINE BLUFFS.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1900	....	....	....	....	....	....	....	....	....	....	36.4	31.2	....
1901	28.6	20.3	34.4	44.2	56.5	62.4	72.9	70.2	57.8	47.6	41.2	27.6	47.0
1902	24.8	31.6	34.8	45.0	56.6	64.7	66.6	70.0	58.2	48.8	37.4	26.1	47.0
1903	29.0	15.4	32.4	44.3	51.8	59.4	69.4	68.5	57.6	48.6	37.4	33.0	45.6
1904	28.5	31.0	37.5	44.0	53.2	61.2	66.0	68.4	61.0	48.6	40.3	31.8	47.6
1905	23.1	18.0	40.4	39.5	51.4	64.0	65.8	69.9	62.6	43.5	39.0	27.8	45.4
1906	31.0	32.3	24.8	46.5	52.8	60.8	65.8	66.2	60.4	46.7	34.4	34.8	46.4
1907	24.0	36.4	43.7	40.6	48.2	60.6	69.6	68.8	60.0	52.4	36.6	29.6	48.0
1908	30.1	32.4	40.0	47.1	51.3	61.1	68.4	66.8	63.8	49.8	37.2	28.8	48.1
Mean	27.4	27.2	36.0	44.5	52.7	61.8	68.1	68.6	60.2	48.5	37.8	30.1	46.9

MONTHLY MAXIMUM TEMPERATURES, PINE BLUFFS.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1900	....	....	....	76	94	99	99	99	92	82	71	63	99
1901	63	55	68	81	84	94	99	99	85	78	71	69	99
1902	60	61	63	82	85	101	101	98	94	81	72	57	101
1903	53	45	67	78	81	94	97	98	93	82	78	....	98
1904	63	69	70	79	83	87	93	92	95	81	73	68	95
1905	59	63	69	78	82	91	96	99	95	88	74	64	99
1906	68	65	70	77	84	93	93	95	93	....	69	67	95
1907	59	70	86	82	85	88	99	99	91	83	79	70	99
1908	65	73	75	82	87	92	98	99	100	89	82	52	100

MONTHLY MINIMUM TEMPERATURES, PINE BLUFFS

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1900	....	....	....	....	....	....	....	....	....	15	3	—21	....
1901	—19	—23	6	13	30	28	44	45	28	25	10	—28	—28
1902	—25	—18	8	12	30	33	37	44	18	25	3	1	—25
1903	2	—21	3	10	25	33	35	40	13	15	—15	....	—21
1904	—15	—10	0	12	25	35	40	38	27	19	2	—4	—15
1905	—26	—33	14	7	23	43	41	44	35	5	1	—1	—33
1906	0	—12	—14	19	26	32	38	41	35	....	0	2	—14
1907	—8	—10	9	10	7	34	43	39	29	20	—2	—15	—15
1908	—5	—17	9	5	22	35	33	42	17	7	—9	—1	—17

MONTHLY AND ANNUAL PRECIPITATION, PINE BLUFFS.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
1900	....	....	....	5.64	T	0.27	1.76	0.27	0.80	T	T	T	....
1901	T	0.80	0.80	1.45	1.34	2.22	1.00	1.88	0.90	0.20	T	1.60	12.19
1902	0.10	0.45	0.40	0.69	2.22	0.39	1.36	0.50	3.18	0.68	T	1.80	11.77
1903	T	1.00	0.40	0.47	1.45	1.34	2.76	1.91	1.13	0.56	T	0.09	11.11
1904	T	0.20	T	0.89	4.08	0.99	1.57	2.46	0.51	0.20	T	T	10.90
1905	0.50	1.00	0.76	6.71	5.52	2.73	5.21	1.96	0.95	0.90	T	0.00	26.24
1906	T	0.20	3.90	2.86	2.86	1.45	2.04	1.72	0.71	2.00	1.00	T	18.74
1907	0.80	0.40	0.80	T	2.12	1.92	4.61	1.26	0.67	0.12	0.80	0.20	13.70
1908	T	T	0.70	3.16	2.97	2.48	4.91	1.84	0.20	1.90	1.00	0.40	19.56
Mean	0.18	0.51	0.97	2.43	2.51	1.53	2.80	1.53	1.01	0.73	0.31	0.45	14.96

SCHOOLS

STATE LEADS IN EDUCATION.

The State of Wyoming is notable for the educational advantages it gives the children of its citizens. In educational matters it leads many of the older States, in that it employs a larger number of teachers in proportion to its population; that its school year is longer; that the salaries paid its teachers, especially those paid women teachers, are higher, and that its school methods are at all times kept in unison and harmony with the latest and best in modern education.

The amount of funds raised in Wyoming for school purposes by voluntary taxation is liberal, and expenditures in educational matters are not stinted. The Legislature of 1899 passed an act authorizing the district school boards to provide free text-books for all pupils in the public schools. The latest and most approved text-books have been purchased and supplied to every school district in the State. The result of this liberality and of the careful attention given the schools of the State by its citizens and school officers has been to keep the percentage of illiteracy in Wyoming to a nominal figure. A practical illustration of this was shown at the muster of troops in the State for service in the Spanish War. Of 1,000 young men who enlisted in Wyoming not one was unable to sign his name to the muster rolls, and every man had received a fair education.

There were 21,300 pupils enrolled in the public schools of the State in 1908. These are in attendance at 524 schools. Omitting the city schools, the average attendance is ten pupils. Sparsely settled communities in Wyoming enjoy equal school facilities with more thickly settled regions. It is the universal custom in the State to establish a school if five pupils can attend. The result is that practically all children of school age have an opportunity to attend school. A compulsory school law is on the statute books, but it has never been found necessary to enforce it, as school attendance is voluntary.

The number of teachers in 1908 employed in the State was 899. The salaries paid teachers average \$69.15 per month, which, when it is considered that the country schools form the great majority of the entire number, compares most favorably with salaries paid in other States.

The 538 school buildings of the State are generally well built and comfortable. The cost of construction has been upward of half a million dollars, while repairs and improvements amounting to \$10,000 are made annually. As the sparsely settled communities of the State grow, the primitive log building, which at first constitutes the school house, gives place to the neat frame or brick structure with all the modern apparatus for successful educational work.

The State Superintendent has prepared a uniform course of instruction for the graded and ungraded schools of the entire State. This has served to systematize the work of teachers and county superintendents, and has added materially to the effectiveness of the service.

One of the most valuable aids to the support and maintenance of the public school system in Wyoming is the fund received annually from the rental of school lands. During the past year the sum of \$127,313 was received from this source and distributed to the school officers of each county in proportion to the number of pupils in each. The total acreage of school land in the State which may be utilized for this purpose is 3,600,000 acres. It may reasonably be expected that sufficient income will be received from the rental of school lands within the near future to increase the efficiency of the schools of the State to the highest degree, and this without imposing additional burdens upon the tax payer.

THE UNIVERSITY OF WYOMING.

The foundation of the University of Wyoming was a bill passed by the Ninth Legislature of the Territory of Wyoming, which convened on the 12th day of January, 1886. This act, among other provisions, secured the establishment of a university in the city of Laramie.

A site consisting of twenty-one acres was procured, partly by donation from the city of Laramie and partly by purchase from the Union Pacific Railroad, and by the summer of 1887 a sufficient portion of the main building was completed to justify the opening of the university in the fall.

The university has been growing in faculty, attendance and equipment ever since. The faculty has increased and the student attendance has reached 250; the campus has been doubled in size, and new buildings have been erected, until the plant is estimated at present to be worth a quarter of a million.

The first building erected is of sandstone, three stories high, and is 150 feet in length and 50 feet in breadth. The rooms, twenty-eight in number, as well as all the corridors, are heated by steam and lighted by electricity. The auditorium in the second story is one of the finest assembly halls in the State, and will seat with comfort 500 people. This edifice cost over \$85,000 and would honor any educational institution in the United States.

A second building, costing \$12,000, with a commodious wing, was completed in the spring of 1893 for the College of Mechanical Engineering. On the first floor is the iron room, and the second floor is occupied entirely by the wood room. Another large wing was added in the summer of 1899. The mechanical building is constructed of the same material as the main building, and contains twelve rooms. The new wing of the mechanical building has been fitted up for the use of the School of Mines. More than \$15,000 has already been spent in equipping this building with tools and machinery.

A third building, known as the Hall of Science, has been completed. The general style of the building is the collegiate Gothic; the material used is the same gray sandstone as in the other buildings. The geological, biological and chemical departments will be placed in this new building. Each of these departments will occupy a separate story in the building,

which will give ample and convenient accommodation for their laboratories and museums. The building is 50 feet by 80 feet, with a two-story extension on the rear, and cost \$35,000.

The university library now contains 16,000 bound volumes, and in addition several thousand unbound bulletins and reports. Since the founding of the institution large sums have been expended for apparatus in the different scientific departments. As a result the laboratories are as well equipped as in any of the institutions of the West.

The museum of geology and paleontology is constantly growing in importance. The collection of saurians is particularly valuable. This collection is represented by parts of many animals that have been described by Marsh, as well as by several new forms. The Yale collection alone surpasses that of the university in American Jurassic vertebrates.

The university has by all odds the largest and most representative collection of Rocky Mountain plants. The herbarium now contains 40,000 specimens. It represents the flora of Wyoming, so far as known, and contains the types of many new species recently described.

What the University of Wyoming is doing for the higher education of the young people of the State is shown by the following courses of study.

THE COLLEGE OF LIBERAL ARTS.—There is first the College of Liberal Arts, giving in four years what is commonly known as a "college education." In the first two years of this department all the studies are prescribed, although the student has the choice between the classical, literary and scientific courses. In the last two years almost all the studies are elective. By this arrangement it is believed that a sufficiently broad and thorough course is insured, and at the same time the tastes and needs of the individual student are allowed free scope.

THE PREPARATORY SCHOOL.—Since there are many parts of the State not yet provided with high schools fitting for the university courses, a preparatory school with a course of three years' work is maintained.

THE GRADUATE SCHOOL.—This department affords an opportunity for those who wish to carry their studies beyond the limits of the college courses.

Then for the benefit of those who can not devote so much time to general education, but who wish to be trained for some special profession, four technical schools are provided, viz.: **THE NORMAL SCHOOL, THE SCHOOL OF MINES, THE COLLEGE OF AGRICULTURE and THE COLLEGE OF MECHANICAL ENGINEERING.** These courses all require less time by two years than the College of Liberal Arts, and are designed to give a thorough and practical preparation for those professions which are more particularly demanded now in this new State.

THE BUSINESS COLLEGE.—The more recently organized Business College offers two years' training in commercial methods and practices.

The University of Wyoming is founded and maintained for the purpose of being as useful as possible to the people of Wyoming. The university is, therefore, devoting its attention not only to the study of problems of general interest and theoretical importance but especially to the solution of those great problems which confront the people of this new and unde-

veloped State. With this thought in mind, all plants and minerals sent to the university are determined gratis. Assaying was at first done free of charge for all citizens of the State requesting it, and now only a nominal fee is charged. Mineral waters are analyzed and oils are examined, fossils are identified, and special scientific information upon any topic is sent to any one in the State upon request.

As rapidly as possible the School of Mines is making a geological survey of the State with special reference to its economic products. As no appropriation has been made for this purpose by the State, the work can only be done by the faculty during the time not required for other duties. However, seven bulletins have already been issued along this line: Notes on the Mineral Resources of Wyoming, The Heating Value of Wyoming Coal and Oil, The Artesian Basins of Wyoming, The Salt Creek Oil Field, The Petroleum of the Shoshone Anticlinal, The Petroleum of the Powder River Fields, and The Petroleum of the Belle Fourche Oil Field.

The fifteenth annual report of the Board of Trustees, for 1907-8, gives a digest of important facts regarding the university. From this report are obtained the following figures showing additions to the equipment of the University during the year ended June 30, 1908:

Buildings and land.....	\$30,000.00
Library.....	2,300.00
Apparatus.....	2,575.20
Machinery.....	2,182.92
Live stock.....	2,099.00
Total.....	\$39,157.12

The receipts for and during the year ended June 30, 1908, were as follows:

1. State aid—	
(a) Income from endowment granted by State.....	\$23,747.13
(b) Appropriations for buildings or other special purposes.....	6,000.00
(c) Tax levy for buildings or other special purposes.....	11,106.53
2. Federal aid—	
Additional endowment, act of August 30, 1890.....	\$30,000.00
3. Income from endowment other than Federal or State Grants	4,844.63
4. Fees and all other sources—	
(a) Tuition fees.....	\$ 984.75
(b) Incidental fees.....	50.50
(c) Miscellaneous receipts... ..	2,037.93
5. Total.....	\$78,771.47
6. Federal appropriation for experiment stations, act of March 2, 1887.....	\$15,000.00
7. Adams appropriation for experiment stations.....	9,000.00

The property of the University, at the close of the fiscal year, June 30, 1908, was as follows:

Value of buildings.....	\$215,000.00
Apparatus.....	71,614.91
Machinery.....	38,899.92
Library.....	34,279.45
Live stock.....	8,074.50
Other equipment.....	10,800.00
Total number of acres in farm and grounds.....	416
Acres under cultivation.....	180
Acres used for experiment.....	180
Value of farm and grounds.....	\$43,000.00
Number of acres allotted to state under Act of July 2, 1862.....	90,000
Acres still unsold.....	90,000
Value of unsold land.....	\$90,000.00
Amount of land-grant fund of July 2, 1862.....	\$21,450.57
Number of bound volumes in library, June 30, 1907	24,000
Number of pamphlets in library, June 30, 1907	15,000

The number of students at the University in the year 1906-07 is shown in the following table:

Graduate.....	18
Liberal Arts—	
Collegiate.....	29
Preparatory.....	25-54
Normal School.....	28
College of Agriculture and Mechanic Arts—	
Agriculture.....	12
Mechanical Engineering.....	20
Mining Engineering.....	16
Civil and Irrigation Engineering.....	6
Commerce.....	28-82
School of Music.....	12
Summer School.....	42
School of Correspondence.....	5
	<hr/>
Counted more than once.....	241
	<hr/>
Total.....	223

PUBLIC LIBRARIES

Wyoming early made provision for the purchase and exchange of valuable law books and reports. The Library is in charge of the State Librarian, under the direction of the Justices of the Supreme Court, and is open during the business hours observed by the public officers at the capitol. The law library contains nearly 20,000 volumes, exclusive of the public laws and documents of the State.

Of the 260,000 acres of land granted by the General Government for State charitable, educational, penal and reformatory institutions, in addition to special land grants for such purposes, 15,000 acres were set aside in 1897 for the maintenance of the law library. At the present time these lands yield an annual income from the rents of about \$750, which is used in the purchase of new books.

An act to increase the State Library by adding a miscellaneous collection of standard books was also passed by the Legislature in 1897, and 15,000 acres of land set aside, the income from which is to be used in the maintenance of a miscellaneous library. The nucleus of such a library, consisting of several hundred volumes, has been purchased, and is now available to the citizens of the State. Provision has also been made by the State for the establishment of county libraries, and in many counties such libraries are maintained for the benefit of the residents. Under the auspices of the Wyoming Historical Society have been collected many early books, papers and documents bearing upon the early history of Wyoming, which are open to inspection at the State Library. The collection of Wyoming minerals shown at the World's Fair, and the medals and diplomas awarded, are also upon exhibition at the capitol.

EXPERIMENT STATIONS

ENDOWED BY CONGRESS.

The Wyoming Experiment Station is the department of research of the College of Agriculture of the University of Wyoming. Congress in 1887 appropriated \$15,000 annually for this purpose, and on January 10, 1891,

the Wyoming Legislature authorized the University of Wyoming to receive this appropriation. The work of the station is to aid in the acquiring and diffusing among the people of the United States, and especially of Wyoming, useful and practical information on subjects connected with agriculture; to conduct scientific investigations and experiments on the physiology of plants and animals; to investigate animal and vegetable diseases and parasites; to chemically analyze soils and water and vegetable and animal products; to acclimate grain and grasses, fruits and vegetables, to our arid climate and high altitude; to ascertain the best methods of irrigation, and of retaining moisture in the soil; to find the best breeds of stock, and the best varieties of field and garden crops for the various portions of Wyoming; and to carry on any other experiments which promise to benefit our agricultural and grazing interests.

The results of these experiments are published in the station bulletins which are sent free on request to residents of the State.

Some of the fifty-five bulletins thus far published by the Agricultural Experiment Station are as follows: First Report on the Flora of Wyoming; Fruit Growing in Wyoming, and Cultivated Shade and Forest Trees; Some Native Forage Plants for Alkali Soils, and the Trees of Wyoming and How to Know Them; Irrigation and Duty of Water, and Alfalfa as a Hay Crop; Wyoming Sugar Beets; Lamb-Feeding Experiments.

The thought has been to make these bulletins popular and educational in their nature, and such as will meet the demands of the farmers by giving them practical information. Altogether there have been published by the university over 5,000 pages on the agricultural and mineral resources of the State, all original matter, based on experiments and explorations by the scientific members of the faculty. The settler new to the country will find in these publications information as to crops and methods which will save him thousands of dollars and years of work in the fruitless experiments which he might otherwise undertake.

WORK OF THE STATION.

The following sketch of the experimental work being carried on along the line of the Union Pacific Railroad in Wyoming is furnished by one of the experts at the State Experiment Station:

CO-OPERATION—The Station co-operates with farmers and ranchmen who will furnish reports of their results to us. Heretofore this co-operation has been largely through the distribution of seeds. A large amount of sugar beet seed has been distributed and analyses of the crops grown have been made to demonstrate in what region sugar beets can be successfully produced. This co-operation is now being extended to the live stock industry, and much is being done by personal visits, inspection and advice, to help the farmers to produce more and better live stock.

ALFALFA—Many packages of Turkestan alfalfa were distributed to farmers and demonstrations made which show that this valuable plant can be successfully produced even at altitudes above 7,000 feet. The introduction of alfalfa and demonstration of the possibility of producing large crops has been worth many dollars to the Laramie Plains.

SMALL GRAINS.—Many varieties of wheat, oats and barley have been grown widely over the State. Macaroni and Russian Spelt are being grown by many ranchmen and seem to stand drouth better than other grains. Early oats and barley have also been obtained, which ripen with certainty at high altitudes.

FORAGE PLANTS.—In addition to the work with alfalfa, seeds of many grasses and forage plants have been distributed. Some of the native grasses, seeds of which have been collected and distributed, are very promising, and several of the native salt sages are of importance for alkali lands where other plants do not succeed and where "Australian salt bush" will not grow because of our short seasons. Investigation of forage plants under way promises results of great value.

SHEEP FEEDING.—A co-operative feeding experiment has been carried out in connection with the Cosgriff Brothers at Fort Steele, and two bulletins have been published, Nos. 51 and 57, showing the results of feeding grain and hay and reporting studies of range conditions.

IRRIGATION.—Some important investigations have been carried on in co-operation with the office of Irrigation Investigations of the United States Department of Agriculture. The new studies carried out the past year on Sand Creek promise to be of national importance, as they will aid in the final settlement of the interstate complications.

ALKALI.—Some studies and co-operations have been done with the alkali problem along the line of the Union Pacific in southern Wyoming. Many samples of this alkali salt have been collected and analyzed, and seeds of alkali resisting plants distributed to aid in bringing such unproductive lands into use.

FRUIT GROWING.—The principal fruit experiments have been carried out at Lander, where the altitude is sufficiently low to make results more certain. As it takes much time to grow fruit trees and shrubs, this work promises to be of importance for some time to come.

PLANT AND ANIMAL DISEASES.—Some attention has been given to disease troubles of plants and animals, and the Station is ever ready to help farmers in any way possible.

FISH CULTURE

BY S. H. CAMPBELL, STATE FISH COMMISSIONER.

Not many years ago it was believed that the trout region in this State could not be extended beyond those sections where the species was a natural product. This included all of the Platte River and its tributaries, embracing nearly two-thirds of the State, and more than 6,000 miles of waterway. The counties which were barren of trout life are Crook, Johnson, Weston, Converse, Natrona, Laramie, Albany, Carbon, a little more than half of Sweetwater, a part of Fremont and Sheridan.

That this belief was not well founded is evidenced by the fact that to-day some of our finest and best trout streams are found in the southern part of the State, and the annual catch from streams into which trout were first introduced from the State hatchery now exceeds the catch from native streams. The entire State may now be regarded as suitable to the habitat

of the rainbow and brook trout, and the waters may be stocked with entire confidence as to results.

I will speak of only one of the varieties of trout which now inhabit the waters of the State—the rainbow trout (*Salmo irideus*). The body of the rainbow trout is comparatively short and deep and is more elongate in males than in females. The average depth is contained about three and four-fifths times in the body length. The short head, which is obtusely ridged above, is about one-fourth the total length. The mouth is smaller than in other species of *Salmo*; the maxillary reaches scarcely beyond the eye, which is rather large. The caudal fin is distinctly but not strongly forked. On the vomer are two irregular series of teeth. The dorsal rays number eleven and the anal ten. In the typical species there are about 135 scales in the lateral series, with twenty rows above and twenty below the lateral line. The color is variable, depending on the sex, age and character of water. Typical adult fish are bluish above, silvery on the sides, profusely and irregularly dark spotted on the back and sides, the spots extending to the vertical fins, with a red lateral band and blotches and a nearly plain abdomen.

The rainbow trout is not a native of this State, its original habitat being the Pacific Coast of the United States. It is especially abundant in the mountain streams of California but has been successfully transplanted in a number of the mountain streams of this State. The best results, however seem to have been obtained from plants made in the Platte, Big and Little Laramie Rivers. It was first introduced into the waters of this State by the Hon. Otto Gramm in 1885. Mr. Gramm received a consignment of 10,000 trout eggs of the rainbow variety from the United States Commission of Fish and Fisheries, which was shipped to him from the McCloud River in California. The fry were planted in the Big Laramie River in Albany County.

They show special adaptability for the deeper parts of the larger waters, being more inclined than brook trout to drop down stream and frequent or inhabit the deeper and warmer sections where food is more abundant. The inevitable result of this tendency is that they outstrip the brook trout in growth and size. Specimens of eight and ten pounds have been taken by the rod and fly fishermen from the Big Laramie River, while a four or five pound rainbow no longer attracts special attention.

For the angler the rainbow trout is without a rival among fresh water fishes—universally acknowledged a superior game fish, a vigorous biter, and an intelligent fighter for liberty.

The rate of growth is largely a question of food, temperature of water and extent of range. In water at 60 degrees, with plenty of food, fish one or two years old will double their size several times in a single season, while in water at 40 degrees, with limited food, the growth is scarcely perceptible. Some grow much faster than others under the same conditions. The average growth under favorable artificial conditions is: One year old, from three-fourths to one ounce; two years old, from eight to ten ounces; three years old, from one to two pounds; four years old, from two to three pounds. They will grow until they are from eight to ten years old, the rate of growth diminishing with age.

Considering the results that have been accomplished in the sixteen years since the establishment of the State fish hatchery, and since the stocking of the streams was begun, it must be conceded that it has been a magnificent investment. The ardent disciple of Izaak Walton will travel far to gratify his love of sport and it is now becoming widely known that Wyoming offers him a fruitful field. Accustomed, perhaps, to the broader creeks and rivers of the East, he is astonished to find here the smallest mountain stream densely populated with the finny tribe so that he never need fail to make a good haul. In addition to this he has the advantages of scenery not surpassed in the Rocky Mountains and of a climate that is perfection itself. It is small wonder that in a single month during the summer the number of arrivals registered at one hotel in Laramie, of those composing fishing parties from all parts of the country, has exceeded 500. The amount of money that would be left by such a number in every department of trade engaged in outfitting pleasure parties would be hard to compute, while as to the advertising the country would naturally receive from this class of visitors after their return home, it is without limit. Every year the number of those who come not only to Laramie but to other parts of the State to indulge in this delightful pastime is increasing and the scope of country from which they come is widening so that there is scarcely anything that can result in more substantial benefit to the State than to keep the streams well stocked and the fish properly protected.

LANDS

GOVERNMENT LANDS.

The area of Wyoming is 97,890 square miles, or 62,645,120 acres. Of this vast area 51,890,201 acres are surveyed, and 10,754,919 acres are not surveyed.

The public lands vacant and subject to entry and settlement in the State, according to the last report received from the United States General Land Office, were: Surveyed lands, 42,173,839 acres; unsurveyed, 7,167,744 acres; total, 49,341,583 acres.

The unappropriated lands of the United States in the State of Wyoming, as comprised in the several counties, are, in acres: Albany, 1,746,076; Big Horn, 6,533,060; Carbon, 3,683,868; Converse, 4,051,949; Crook, 3,099,527; Fremont, 5,683,126; Laramie, 2,892,293; Johnson, 2,432,422; Natrona, 3,311,466; Sheridan, 1,313,138; Sweetwater, 6,406,249; Uinta, 5,603,264; Weston, 2,579,147.

The public lands in Wyoming consist chiefly of grazing, timber and agricultural land, though there are large areas of coal, oil and mineral lands.

The agricultural lands are those lying contiguous to the rivers and streams, and are vast in extent, but crops can not be successfully raised without irrigation, except by scientific methods of soil culture. By the application of water the soil is rendered productive, and is not surpassed by the fertile States of the Mississippi and Missouri Valleys.

The laws under which title to Government land may be acquired by citizens of the United States are the homestead law, the desert land law, the timber and stone law, and the coal and mineral laws.

The homestead law secures to qualified persons the right to settle upon, enter and acquire title to not exceeding one quarter section (160 acres) of public land by establishing and maintaining residence thereon and improving and cultivating the land for a period of five years. A homestead entryman must be the head of a family, or a person who has arrived at the age of twenty-one years. He must be a citizen of the United States, or one who has declared his intention to become such, as required by the naturalization laws. The Act of March 3, 1891, attaches the condition that he must not be a proprietor of more than 160 acres of land in any State or Territory.

The class of lands subject to entry under the homestead laws is described by the Statutes as unappropriated public lands. Parties who are prevented by reason of distance, bodily infirmity or other good cause from personal attendance at the district land office may make the preliminary affidavits for homestead entries within the county in which they reside, before any commissioner of the United States Court having jurisdiction over the county in which the land is situated, or before the judge or clerk of any court of record of such county, transmitting the same, with their application and the proper fees and commissions, to the Register and Receiver of the district land office, thus permitting entries to be made without personal attendance at the district office. Applicants availing themselves of this privilege are required to transmit with their applications an affidavit setting forth specifically why they can not appear at the land office.

Where a wife has been divorced from her husband or deserted, so that she is dependent upon her own resources for support, she can make a homestead entry as the head of a family or *femme sole*.

A single woman who makes a homestead entry and marries before making proof, does not forfeit her right, provided she does not abandon her residence on the land to reside elsewhere. Where two parties, however, unite in marriage, each having an unperfected homestead entry, both entries can not be carried to patent. A residence elsewhere than on the land entered for more than six months is treated as an abandonment of a homestead entry.

Parties desiring to commute their homestead entries to cash are required to make proof of settlement and of residence and cultivation of the land for a period of fourteen months from the date of entry.

There are many other provisions relating to restoration of rights, adjoining homesteads, soldiers' and sailors' homestead rights, additional entries, etc., too numerous to mention in the space of this brief article.

The following is a table of fees and commissions charged in the mountain States:

ACRES	CLASS OF LANDS	COMMISSIONS		FEE	TOTAL
		Payable when Entry is Made	Payable when Certificate Issues	Payable when Entry is Made	
160	\$2.50	\$12.00	\$12.00	\$10.00	\$34.00
80	2.50	6.00	6.00	5.00	17.00
40	2.50	3.00	3.00	5.00	11.00
160	1.25	6.00	6.00	10.00	22.00
80	1.25	3.00	3.00	5.00	11.00
40	1.25	1.50	1.50	5.00	8.00

All lands, exclusive of timber lands and mineral lands, which will not, without artificial irrigation, produce some agricultural crop, are deemed desert lands, and are subject to entry under the desert land law. The party making entry is required at the time of filing his declaration to file also a map of the land, which will exhibit a plan showing the mode of contemplated irrigation, which plan shall be sufficient to irrigate thoroughly and reclaim said land and prepare it to raise ordinary agricultural crops. Persons may associate together in the construction of canals and ditches for irrigating and reclaiming tracts entered or proposed to be entered by them, and they may file a joint map, or maps, showing their plan of internal improvements. No person is permitted to enter more than 320 acres of land in the aggregate under all the land laws of the United States, mineral lands excepted. Parties initiating desert claims are required to show observance of such inhibition.

The right to make desert land entries is restricted to resident citizens of the State in which the land sought is located. Citizenship and residence must be duly shown. The entryman must expend at least \$3.00 per acre, \$1.00 per acre during each year for three years, and must file proof thereof during each year, such proof to consist of his affidavit, corroborated by the affidavits of two or more witnesses, showing that the full sum of \$1.00 per acre has been expended during such year and the manner in which expended, and at the expiration of three years a map or plan showing the character and extent of the improvements.

Failure to file the required proof during any year shall cause the land to revert to the United States, the money paid to be forfeited and the entry to be canceled. The party may make his final entry and receive his patent at any time prior to the expiration of three years by making required proof of reclamation and of the expenditure of the aggregate amount of \$3.00 per acre, and of the cultivation of one-eighth of the land. Persons making desert land entries must acquire clear right to the use of sufficient water for the purpose of irrigating the whole of the land, and of keeping it permanently irrigated. Persons making desert land entries before they have secured a water right do so at their own risk. The price of land sought to be entered under the provisions of the desert land act is \$1.25 per acre, without regard to the situation of the lands in relation to railroad grants. When proof of the character of the land has been made, the applicant will pay the receiver 25 cents per acre for the land applied for. At the time of making final proof the payment of \$1.00 per acre is required.

The Act of June 3, 1878, provides that surveyed lands in the public land States, valuable chiefly for timber and stone, unfit for cultivation and consequently unfit for disposal under the homestead and desert land laws, may be purchased by individuals and by associations at the minimum price of \$2.50 per acre. A party making application to purchase a tract of this character is required to make affidavit that he is a citizen of the United States by birth or naturalization, or that he has declared his intention to become a citizen under the naturalization laws. The quantity of land which may be acquired lawfully under said act by any one person or association is limited to not exceeding 160 acres, which must be in one body.

A qualified person has the right to enter by legal subdivision any quantity of coal lands in the United States not otherwise appropriated or reserved by competent authority, not exceeding 160 acres to such individual person, or 320 acres to an association, upon payment to the Government of not less than \$10 per acre for such lands, where the same shall be situated more than fifteen miles from any completed railroad, and not less than \$20 per acre for such lands as shall be within fifteen miles of such road. A party or association having opened and improved any coal mine, or mines, upon the public lands and who shall be in actual possession of the same, is entitled to a preference right of entry, and it is provided that when any association of not less than four persons, duly qualified as provided by law, shall have expended not less than \$5,000 in working and improving any coal mine, or mines, such association may enter not exceeding 640 acres, including such mining improvements.

Lands valuable for deposits of mineral, such as fire and pottery clays, marble, asphalt, soda, sulphur, diamonds, or of the precious and common metals, are subject to sale under the mining laws. A location must first be duly made and recorded, and certain sums must be expended annually. Five hundred dollars worth of labor and improvements must be laid out on each claim before patent can be applied for. The rules and regulations and methods of procedure are too extensive and complex to be reviewed at length in the compass of this brief article. Mining locations defeat all railroad and State selections, if the mines and minerals were known to exist, or were discovered prior to the time the road and State claims took effect. Homestead, desert, and timber and stone entries can not embrace known mineral lands, unless it first be shown that the lands sought to be entered are more valuable for agricultural purposes than for the minerals they contain.

STATE LANDS.

There are two classes of State lands:

First—Those donated to the State for various public purposes and over which the State has absolute control.

Second—Those known as “arid lands,” whose donation to the State is conditional upon their reclamation.

Under the provisions of the Constitution and statutes, the State Board of Land Commissioners, consisting of the Governor, Secretary of State and Superintendent of Public Instruction, have the direction, control, disposition and care of all lands granted to the State.

The Act of Admission provides that all school lands, including the grant for the use of the Agricultural College, shall be sold for not less than \$10 per acre. The Constitution provides further that lands heretofore and hereafter acquired shall be sold for not less than \$10 per acre, and that such lands shall be disposed of at public auction, providing also that actual and bona fide settlers shall have the preference right to purchase in tracts not exceeding 160 acres.

The State Board of Land Commissioners may lease any legal subdivision of the lands of the State at an annual rental not less than 5 per cent of the valuation thereof, fixed by the Board, conditioned upon the payment of

the rent annually and in advance, and for periods of not more than five years. When any lease expires by limitation the lessee may, with the permission of the Board, renew the same as follows: At any time within ninety days next preceding the expiration of the lease, the lessee or his assigns shall notify the Register of his or their desire to renew the lease. If the lessee and the Board be agreed as to the valuation of the land, a new lease shall be issued, bearing even date with the expiration of the old one, and upon like conditions.

The power given to the Board to refuse to renew a lease, or to sell State lands at the expiration of a lease, or, again, to lease to other parties than the original lessee, shall not apply whenever the original lessee of the State lands, or his assigns, shall have, during the period of his lease, or prior thereto, reclaimed the same by irrigation, and shall have provided suitable ditches for its full and complete reclamation, and shall have secured an adequate and perpetual water supply for said land; then and in that case the original lessee shall have the right to renew such lease for a term of five years, which renewal may be repeated for the same period five years thereafter, and may again be repeated for the same period ten years thereafter, making a total period not to exceed twenty years; provided, that each of said renewals shall be dependent upon the continuous irrigation and cultivation of at least forty acres in every 160 of said land, and in case the lessee shall have failed to cultivate the said land, then said Board shall have the authority to refuse to renew the lease, as hereinbefore provided.

The lessee of State lands is prohibited, in all cases, from cutting or using more of the timber thereon than shall be necessary for the improvement of such lands, or for fuel for use of the family of the lessee, and from the cutting and hauling of timber from leased State lands to saw-mills.

Any lease of State lands procured by fraud, deceit, or misrepresentation may be canceled by the Board upon proper proof thereof.

Necessary blanks will be supplied any person desiring to lease State lands, upon application to Register of State Board of Land Commissioners.

The following is a statement taken from the State's land office records and shows with what rapidity the leasing of State lands grows in favor.

Land Commissioner Fuller, in his biennial report for the period from October 1, 1907, to September 30, 1908, says:

"In cases where leases expired and no applications for renewal were filed competition has, in many cases, increased the rentals paid. The more valuable lands were leased prior to 1905 and without much effort on the part of the State. During the past two years more than 260 school sections and other lands, in a total amount of 169,652.97 acres, which had never before been leased, have been leased at an annual rental of \$5,834.29.

"The land board has not endeavored to exact from prospective lessees the highest possible rental that could be secured. Leases have been renewed, as a rule, at the same rental as charged in original leases, according to a general classification of lands based on a valuation of 50 cents per acre for arid or desert lands absolutely without stock water, \$1.00 an acre for lands containing stock water in any amount or at any time during the grazing season, and

from \$2.50 to \$5.00 per acre for lands susceptible of irrigation. The latter classification causes some change in rentals, as many sections which were rented five years ago under the lower classifications have, by reason of the construction of canals and private ditches, been found to be irrigable.

“In the early days of the leasing of school lands the maximum revenue fixed by the most optimistic was \$100,000 per year. The fixed rentals under the 4,761 leases of common school lands covering 2,418,355.80 acres of an average value for leasing purposes of 97 cents an acre will now yield an annual rental of \$116,962.27.

“The actual amount collected during the fiscal year ending September 30, 1908, from common school rentals, was \$115,542.96. The total for the two years ending September 30, 1908, was \$222,617.68. It will thus be seen that the revenue received for common school purposes already exceeds the maximum fixed by the most optimistic members of previous State Boards.

“As to all school and state lands, September 30, 1904, there were in force 3,795 leases covering 2,120,629.26 acres of land, having a total annual rental of \$94,960.40. On September 30, 1908, 5,679 leases were in effect, covering 3,025,709.68 acres, having an annual rental of \$148,529.70.

“The receipts of the land department, including interest on land fund investments and the 5 per cent from sale of United States lands, for the two years ending September 30, 1908, were \$457,975.14, as compared with receipts of \$253,528.63 for the two years ending September 30, 1904, and \$358,386.51 for the two years ending September 30, 1906.

“The average value of common school lands for leasing purposes has been increased from a trifle less than 86 cents to a trifle less than 97 cents. The school and granted lands containing stock water or valuable for grazing purposes are in constant demand.

“Applications for lease or selection are checked up, and, if vacant lands in the vicinity are noted on the application, the applicant is requested to lease the vacant land in his vicinity or to refer the Commissioner to some party who can use the lands. Where selections containing stock water are made in the immediate vicinity of school sections which are not leased, the commissioner requires that the arid sections shall be leased, and by this plan has considerably increased the school revenue.”

The following table shows the increase in the leasing department:

	No.	ACREAGE LEASED	ANNUAL RENTAL
Leases in effect September 30, 1896.....	472	188,022	\$ 8,501
Leases in effect September 30, 1898.....	1,448	888,613	37,431
Leases in effect September 30, 1900.....	3,145	1,860,225	75,664
Leases in effect September 30, 1902.....	4,005	2,302,501	95,925
Leases in effect September 30, 1904.....	3,795	2,120,629	94,960
Leases in effect September 30, 1906.....	4,251	2,577,903	110,703
Leases in effect September 30, 1908.....	5,191	3,025,709	148,529

UNION PACIFIC LANDS.

The State of Wyoming is crossed from east to west by the Union Pacific Railroad, in aid of the construction of which the Congress of the United States gave to the railroad company every odd numbered section of land lying

within twenty miles on either side of its road. The area of the land so granted in the State of Wyoming aggregated about 5,070,000 acres, and there remain unsold 1,098,098.77.

The unsold land is situated in the various counties as follows:

	ACRES
Laramie County.....	1,613.95
Albany County.....	31,771.48
Carbon County.....	266,157.07
Sweetwater County.....	678,552.86
Uinta County.....	120,003.41
Total.....	1,098,098.77

These lands are being sold at prices ranging from \$1.25 per acre upward upon the following terms:

One-tenth of the purchase money is payable at time of purchase. At the end of the first year interest only, at the rate of 6 per cent per annum on the deferred purchase money, is payable. At the end of the second year, and each year thereafter, one-tenth of the purchase money becomes due, together with interest on the deferred amount at the rate of 6 per cent per annum.

Contracts may be paid up in full at any time before maturity, and interest will be charged only to the date of final payment.

Five per cent discount will be allowed upon the unpaid, unmatured installments of principal which have more than nine months to run, where final payment is made upon a contract within five years after its date.

Ten per cent discount from list prices will be allowed upon cash sales.

These lands are sold under the supervision of the Land Commissioner of the Union Pacific Railroad at Omaha, Neb.

MOUNTAIN RANGES

ERROR OF MAP MAKERS.

People understand as a rule that the Rocky Mountains extend through Wyoming from the southeast to the northwest. Map makers have universally represented them in this manner, but in reality there are no continuous ranges across the State. The front range of the Rocky Mountains in its northern extension into Wyoming from Colorado, divides near the Wyoming line, the eastern branch forming the Laramie Mountains and the western the Medicine Bow range. The Laramie range (not the Black Hills as many call it) extends from the State line north to Laramie Peak, thence westward, terminating at the North Platte River about ten miles west of Casper. This is a granite range varying from 7,500 to 10,000 feet above the sea, moderately rough, but there are large areas that are composed of high, rolling plateaus. There are small local forests and many small streams. The Medicine Bow Mountains extend into Wyoming from Colorado only a distance of fifty miles and then suddenly die out in a rough plain. This range is composed of schists, quartzites and granites, is clothed with large pine and spruce forests, and in its highest peaks reaches an elevation of over 12,000 feet. Westward from the Medicine Bow, and parallel with it is the Sierra Madre, which is the northern

extension of the range of mountains on the west of North Park, Colorado. This range terminates only twenty-five miles north of the Colorado-Wyoming line, in a broad, circular outline facing the depressed area south of Rawlins. It is moderately high, reaching an elevation of about 10,000 feet and is composed almost entirely of a schistose formation. There are three great ranges that enter Wyoming from the southeast, and as shown they all disappear long before they reach the central part of the State. Hence it must be understood that the Rocky Mountains die out in Wyoming; but farther to the northwest they reappear again and culminate in the Wind River range.

North of the Medicine Bow Mountains about thirty miles are the Freezeout Hills, that rise out of the plain country north of Medicine Bow Station, and extend northwest for a distance of about twenty miles. These hills are made of sedimentary rocks and are not very high. Paralleling them and to the southwest are the Shirley Mountains, a short granitic range clothed with pine, and extending from the mouth of Troublesome Creek northwest a distance of fifteen miles. The highest point of the Shirley Mountains is not far from 8,500 feet. West of the Shirley Mountains and only a few miles away the Seminoe Mountains rise gradually out of the broken country along the Medicine Bow River, about six miles east of the North Platte River. Their course is nearly west for a few miles and then northwest and finally terminates at or near Bradley's Peak, which is 9,500 feet. The most of the range is granite and schist, poorly timbered and quite broken. The Ferris Mountains are apparently a part of the Seminoe; but their relationship has not been proven. The Ferris commence at a point some ten miles north of the termination of the Seminoe and extend west of north to Green Mountain which dies out before it reaches the Sweetwater River. The entire length of the Ferris Mountains and Green Mountain is about fifty miles. They are narrow, comparatively rough precipitous slopes, slightly forest clad and reach a maximum elevation of nearly 10,000 feet. These ranges parallel the Sweetwater River and are about ten or fifteen miles south of that stream. North of the Sweetwater River, and for a distance of fifty or sixty miles west of Independence Rock there is a series of low rounded granite hills. While the most of these are connected, there are many isolated ones, and none of them rise over a thousand feet above the valley. This hilly region north of the river and in the vicinity of Independence Rock, south of it, is known as the Sweetwater Mountains. North of the Sweetwater Hills or Mountains about fifteen miles is the Rattlesnake Mountain range. This has a strike nearly northwest and southeast, and a length of nearly forty-five miles, the northwestern termination being at Deer Creek and the southeastern at Horse Creek. The range is composed of granite on the southwestern side, and flanked with sedimentary rocks on the northeast, and has a maximum elevation of 8,500 feet.

WIND RIVER MOUNTAINS LARGEST AND HIGHEST.

The Wind River Mountains in their southeastern extension commence at South Pass, are not connected with the other mountains to the southeast, and terminate in their northwestern extension in the Yellowstone Park. The length approximates 140 miles and the width from ten to twenty miles.

This is the largest, roughest and highest range in the State. It is well watered, has an abundance of forests and is made up of granitic and schistose rocks. The absolute elevation of the highest peaks has not been taken, but several of them are between 13,000 and 14,000 feet. West of the northern end of this range is the Gros Ventre, which is a cross range between the Wind River and the Teton. This reaches an elevation of about 12,000 feet, and is much less rugged than the ranges upon either side. The Teton Mountains extend from the Yellowstone Park south to the cañon of the Snake River, a distance of over sixty miles, and are near the western boundary of the State. The range is composed largely of schistose rocks, is very rugged, with vertical walled cañons and inaccessible areas. The Grand Teton is the highest peak, being nearly 14,000 feet above sea and rising nearly 8,000 feet above the valley. The Salt River Range extends from the Teton southward toward the Oregon Short Line Railroad and includes the mountainous country of Uinta County lying south of the Gros Ventre and Teton ranges. These mountains are quite rough, but are largely composed of sedimentary rock. There are no prominent peaks in the range, or at least none that are high enough to compare with the others in this part of the State. North of the head of the Wind River there are two ranges, the Shoshone and the Absaroka, which are just east of the Yellowstone Park. These are rough and high mountains, that are largely made up of volcanic breccia. The rivers have cut deep and rough cañons, and the lower slopes are well provided with forests. Jutting out from the junction of the Shoshone and the Wind River ranges is the Owl Creek, which extends south and east and connects with a spur that extends westward from the lower end of the Big Horn Mountains. The Owl Creek Mountains are largely sedimentary, with a few possible exposures of granite near the Big Horn River. It is not a high nor an important range.

The Big Horn Mountains are the second range in size in the State. They rise out of the great plains in Montana near the Wyoming line and extend southeasterly for a distance of about fifty-five miles, to Clouds Peak; thence about seventy-five miles in a southerly direction, and at last to the westward for sixty miles and joining the Owl Creek on the Big Horn River. With the exception of the center of the range it is not rough and inaccessible. As a rule the slopes are broad and rolling. Opposite Buffalo there is a rugged area less than twenty miles in length that compares favorably with the greatest mountains in the world. The peaks reach an elevation of over 13,000 feet, and they are so sharp and the country so rough that it is prohibitive except to the mountain climber. The range is granitic in the central area; but to the north and south is composed of lime and sandstone.

The western base of the Black Hills is within the Wyoming line, but this does not include the high and rugged areas. North of Sundance there are the Bear Lodge Mountains, that extend from Sundance north and a little west, nearly to the Belle Fourche River. This range is not over 6,500 feet high, is made up of sedimentary rocks cut with porphyries, and is clothed with forest of pitch pine.

The Hartville Hills is a name applied to the hilly region in the vicinity of Hartville. They are low, but often rough hills made up of sedimentary rocks, schists and granites. They cover an area about ten or twelve miles square, and none of the peaks reaches an elevation of 7,000 feet.

The Indian Grove Mountains are a small range extending from the Shirley to the northwest and following along the eastern bank of the Platte River. They have a length of about ten or fifteen miles, and are granitic peaks that rise out of tertiary rocks, and in a way are connected with the Sweetwater Mountains. This granitic exposure is found as far north as the Grand Canon of the Platte, which is a considerable distance below the mouth of the Sweetwater River.

RIVERS AND STREAMS

WHERE THE BIG WATER SYSTEMS RISE.

Approximate lengths of some of the important rivers in Wyoming:

	MILES		MILES
North Platte.....	290	Snake.....	100
Big Horn and Wind.....	250	Shoshone.....	100
Green.....	200	Grey Bull.....	100
Powder and South Fork.....	175	Ham's and Black's Fork.....	100
Belle Fourche.....	130	Yellowstone.....	95
Sweetwater.....	125	Cheyenne and South Fork.....	95
Laramie.....	120	No Wood.....	75

Being located upon the backbone of the continent, Wyoming has many streams rising within its borders, and three great water systems that reach the ocean many hundred miles apart rise within a very short distance of each other in the Wind River Mountains. It is a fact that one may stand on a pass (Two Ocean Pass) and toss a pebble into the Columbia River drainage, and facing about east a second into the Missouri River waters. South of this place, and not far from Union Pass, one can stand upon a slight hill and view tiny water courses that feed the Columbia, Green and Missouri, for they head within a few miles of each other.

The water courses of the State are divided as follows: Snake River system draining into the Columbia, Yellowstone system draining into the Missouri, Green River system draining into the Grand, Bear River system draining into Salt Lake, North Platte system draining into the Platte, South Platte system draining into the Platte and the Cheyenne system draining into the Missouri. Hence it will be seen that the rivers of Wyoming finally reach the Gulf of Mexico, Gulf of California and the Pacific Ocean, where the Columbia River reaches the sea.

The Snake River rises in the lakes in the Yellowstone Park and flows southward through Jackson Hole, and after passing the Snake River Cañon flows eastward into Idaho. Several important streams join it from the east, chief among them being Buffalo Fork, Gros Ventre and Hoback Rivers, which rise in the Wind River and Gros Ventre Mountains and flow westward and to the south to the great river. There are small streams, rather unimportant, that join it from the west and the John Day River from the south.

YELLOWSTONE IS LARGEST.

The Yellowstone system is by far the largest in the State, furnishes the greatest amount of water and drains the greatest territory. Besides the Yellowstone River, there are the following important tributaries to the stream: Clark's Fork, Big Horn, Tongue and Powder. The Big Horn, the largest stream in the State, has numerous tributaries. The following pour their affluence in from the west: Shoshone (Stinking Water), Grey Bull, Owl Creek and the Wind River. In reality the Wind River should have been called the Big Horn, for it is the important tributary of the stream, and from the confluence of the Wind River and Popo Agie the Big Horn commences. The Wind River rises near the northwestern corner of Fremont County and flows southeasterly to the junction of the Popo Agie. It has numerous tributaries that rise in the highest portion of the Wind River Mountains and flow to the northeast and some few that enter from the north. The Little Popo Agie and several smaller streams rise in the Wind River Mountains to the west and south of Lander and, by uniting with the Little Wind River that flows through the Wind River Indian Reservation, form the Popo Agie River. Along the eastern side of the Big Horn River there are numerous small streams and No Wood River, which has such streams as Paint Rock, Medicine Lodge, Ten Sleep, Cañon Creek and Broken Back to augment it. North of this is Shell Creek, an important branch, that rises in the Big Horn Mountains, as do the tributaries of No Wood, and flow westward to the Big Horn. Although the Big Horn and its tributaries rise among the mountain peaks that are snow-clad and are from 12,000 to nearly 14,000 feet high, it soon furnishes water for fertile valleys that range from 4,000 to 6,000 feet above sea level.

The Yellowstone River rises near the head waters of the Wind, southeast of the Yellowstone Park, and flows northwest into the Park, through Yellowstone Lake and to the northward into Montana, where it is joined by the Wyoming streams that belong to that system. The Tongue River rises in the Big Horn Mountains, west of Sheridan and flows nearly north into the Yellowstone. Although a stream of considerable size, it is entirely consumed for irrigation purposes. The Powder River, while a network of small streams in the mountains, often goes dry during the summer months. It drains a vast area of country; but the streams are small, and are to-day consumed in irrigation. The important tributaries are the following: Piney, Clear, Muddy, North Fork, Middle Fork, Red Fork, South Fork and Crazy Woman. All of these with the exception of South Fork rise in the Big Horn Mountains, and flow easterly into the Powder. The South Fork, which is a dry stream for many miles during the summer, heads in the Rattlesnake Mountains and flows northeast and joins the main stream fifty miles southeast of Buffalo.

The Cheyenne River is a small stream except in the spring time and during floods. It rises in the arid country east of the Powder River drainage, and has two important forks. The Belle Fourche, flowing northeast, passes north of the Black Hills, and the main stream flows south of the Hills and to the northeast, uniting with the Belle Fourche, and nearly encircling the Black Hills.

NORTH PLATTE AND TRIBUTARIES.

The North Platte system is extensive, and drains an area nearly if not quite as large as the Yellowstone. This river rises in North Park, Colorado, and after flowing for a hundred miles enters the Wyoming line about seventy miles southeast of Fort Steele, and continues its northerly course to the mouth of the Sweetwater, where it bends to the northeast and finally at Casper to the eastward; but just west of Douglas it flows to the southeast, which direction it maintains until it reaches the Nebraska line. There are no large and important tributaries entering this stream in Wyoming. The largest is the Sweetwater, which rises in the Wind River Mountains to the west and north of South Pass, and flows eastward and joins the river some ten or twelve miles above Alcova. The tributary of second importance is the Laramie River. This is composed of the Little and Big Laramie Rivers. The Little Laramie rises near Medicine Peak of the Medicine Bow Mountains, and flows east and north and joins the Big Laramie on the Laramie Plains. The Big Laramie rises near Clark's Peak in Colorado and flows northward, entering Wyoming just east of Jelm; from which point it follows the main direction of the Laramie Mountains northward for a distance of seventy-five miles, then bends abruptly to the eastward and passes through a cañon in the Laramie Mountains, and finally reaches the North Platte River at Fort Laramie. South of Fort Steele, Big Creek and Grand Encampment Creek are prominent streams that rise in the Sierra Madre Mountains and flow northeasterly to the river. From the Medicine Bow Mountains there are Douglas, French, Brush, Rock and Medicine Bow Rivers. Below Casper are Muddy, Deer, Box Elder, La Prele and La Bonte Creeks, that rise in the Laramie Mountains and flow northward into the Platte River.

GREEN AND OTHER RIVERS.

The Green River system is extensive and receives water from a broad area of country. The main stream rises in the Wind River Mountains, near Fremont's Peak, and flows northwesterly for a distance of about twenty-five or thirty miles, then bends to the westward and finally to the southward, after which it flows to the south, southwest and southeast, until it reaches the Utah line. From the west it receives tributaries in the way, Henry's and Black's Forks, which receive the greater portion of their water from the Uinta Mountains. Ham's Fork, which unites with Black's, however, receives its supply from the Salt Creek range north of the Oregon Short Line Railroad. North of Green River City there are the following streams that enter the river from the west: Slate, Fontenell, Labarge, Piney, Lead and Horse. From the eastward the streams are not many, New Fork and its numerous small feeders and Big Sandy with its tributaries being essential ones. The last mentioned streams all rise in the Wind River Mountains, and flow southwest and west into the Green River.

The Bear River system is small. The river rises in the Uinta Mountains and enters Wyoming some twenty miles south of Evanston. After passing Evanston and following the State line it changes its direction and enters Utah, where it remains for about twenty miles; but returns and flows north-

ward in Wyoming for twenty-five or thirty miles, then leaves the State and finally empties in the Great Salt Lake. There are no tributaries of importance in Wyoming.

The Niobrara system in reality is included in the State; but it is small since it rises near Manville and as a small stream flows eastward to the Nebraska line.

The South Platte system, while of slight importance, does reach the southeastern corner of Wyoming. Fish, Deadman, Dale, Lone Tree, Crow and Lodge Pole are all tributary to the South Platte drainage. These streams all rise in the Laramie Mountains between Cheyenne and Laramie and flow south and east into tributaries to the South Platte River.

LAKES.

As compared with many other States, Wyoming has but few lakes and these are small. The majority of them are found in the mountains in regions where glaciers have been the leading factor in their origin. Lakes of this kind are all comparatively deep, with rocky shores and are filled with pure and clear water. The largest body of water in the State is Yellowstone Lake, which is about twelve by twenty miles. It is irregular in shape, having long projecting arms, and is estimated to have a depth of over 300 feet. To the southwest of this beautiful sheet of water are Shoshone, Lewis and Heart Lakes, that are all within the borders of the Park. All of these are small as compared with Yellowstone. In Jackson's Hole, Jackson's Lake is the second lake in size in the State. This is six by twelve miles. Near this body are Leigh's, Taggart's, Bradley's and several others, all of them small. In the Wind River Mountains there are Fremont's, Boulder and New Fork on the western slope and Bull and numerous small ones on the eastern. Of these Fremont's is much the largest. All of these have been formed through the agency of glaciers. Above 9,000 feet in the Big Horn Mountains there are many small glacier lakes and a few of moderate size for lakes of this type. North and South Ten Sleep Lakes, and others at the heads of Clear Creek and Piney Creek are the most important. There are also a few small lakes in the Medicine Bow and Sierra Madre Mountains. These have not been named, as a rule, and none of them has a diameter of a half mile. Below the foothills there are a few lakes or ponds which have a different origin from the mountain class. These are not common. In Albany County there are a few, as Hutton's and Creighton; in Johnson there is one called Lake DeSmet, and in the Red Desert there are several that are not accurately known. These, together with many others, are simply ponds formed in undrained depressions. They are shallow, and the water is usually impregnated with salts of various kinds and quite muddy. None of these has a diameter of over five or six miles, and in dry seasons they occasionally dry up. There is still another class of lakes known as soda lakes. These are found in the southeastern portion of the State, and are deposits of soda covered with water, or are soda lakes, in which the solution has **not** been sufficiently strong to precipitate salts.

IRRIGATION

HOME OF THE SMALL DITCH.

Wyoming is the home of the small ditch. This is shown by the fact that almost the total appropriations from the streams have thus far been through numerous small diversions rather than by means of fewer large ones. Individual effort and the success attending it form the only reliable gauge by which progress may be measured, for the large canal has not heretofore formed any considerable feature of the growth. The reason for this may be found in the local conditions, but it is doubtless owing, in part, to the fact that large canals, as hitherto undertaken, especially the earlier ones, have not in all cases proven the financial successes hoped for by their projectors. Chief among the local causes which have militated against large undertakings is the ease and comparative cheapness with which the limited acreage of the homestead or desert filing of the settler has been reclaimed, this in turn being attributable to the fact that these entries are practically confined to the vicinity of the streams, so that large undertakings, involving greater expense in proportion to water provided, have either been held in abeyance or, when prosecuted, have proven but indifferent successes in many instances.

It has heretofore been a waste of time to undertake to show a prospective settler the superior advantages incident to securing a water right through a large canal when that right costs him \$10 or more per acre, when there have been plenty of opportunities for him to make his own appropriation, and from the same stream, at a cost of \$3.00.

The provisions of the Carey Act, taken in conjunction with the later amendments thereto, appear to give the best security for capital engaged in canal building, but not all canals projected to reclaim lands segregated under this act have proven successful. Some of these have, indeed, never been begun, others are partly complete, and a few have been finished and the lands patented to the State.

The cause for failures, laying aside mismanagement, the most fruitful cause of disaster in these schemes, has lain chiefly in the cost of a water right under these large canals as compared with the cost of a similar and equivalent right obtainable through the small ditch. The construction of the latter is undertaken and carried on at such times only as will not interfere with other work. It involves labor only, and labor is most often the only capital which the settler can command. On the other hand, the purchase of a water right from a canal company requires either a considerable amount of ready money—\$10 per acre or \$1,600 for a quarter-section being the lowest figures at which any of these water rights have hitherto been sold—or it means the assumption of a debt at the outset of his home-building, which has doubtless deterred many a desirable addition to our population from the undertaking. In fact, the more thrifty a settler is the more averse he is to assuming a debt of such proportions. This is especially true in localities where the annual returns from his labor can not be accurately figured out.

The whole secret of the failures of large canal projects in Wyoming heretofore is found in the fact that the ultimate cost of a water right to the settler has been uniformly above that at which he could secure water for himself, and any changes now becoming apparent in these conditions are chargeable to the further fact that unappropriated water is becoming scarce and expensive. The settler must, therefore, pay more or go without.

The use of water through small ditches irrigating lands adjacent to their borders rather than through large canals reclaiming compact areas has had its compensations if it has not, indeed, been of material advantage to the settler, for it has enabled every farmer to become also a stock raiser through the use of the adjacent grazing lands, thus diversifying his work and output, and securing him greater independence. The irrigator under the large canal is not so situated as to enjoy all these advantages, the scope of his work is more limited, so that in the manner of our growth thus far it will readily be conceded that nothing has been lost.

The number of applications to the engineer for water to reclaim tracts varying in size from three to twenty acres each, received during the past few years, appears to indicate that the day of the small ditch is rapidly passing. This seems to be emphasized by the further fact that applications for water for large tracts to be segregated under the Carey Act have become more frequent. The situation appears generally to be recognized and is doubtless responsible for the increased activity lately shown among those having capital to invest in legitimate irrigation enterprises.

The ordinary flow of the streams, however, does not comprise all of our water assets by any means, for when these are all utilized there will still remain a large and unappropriated surplus in the annual spring floods. Some of the most vital questions of the day are connected with the conservation and use of these waters, and, while the total volume is not known, estimates have been made which show the importance to the west of undertaking their development. As an indication of what may one day be accomplished in Wyoming, it was pointed out a few years ago by Mr. Fred Bond, State Engineer, who kindly furnished much of the data on irrigation here given, that the flood waters of Green River alone, as determined by accurate measurements, will fully reclaim 1,200,000 acres of land. The same class of waters now passing out of the State from the North Platte watershed, exclusive of the Laramie River drainage, will fully reclaim 1,245,000 acres of land; or from both streams there is now going to waste sufficient water to reclaim in round numbers 4,000 square miles.

The active interest of the Wyoming people can not be enlisted too strongly or too early in the cause of securing help to put this enormous power for good into harness and employing it in creating new wealth, new homes and increased population for the State. The floods must be held back until we are ready to use them; but how shall this be secured?

SUCCESS OF IRRIGATION FARMING.

The success which has attended irrigated farming in the arid region of the United States, and the growing importance of the agricultural interests

have attracted much attention. The extension of the irrigated territory, and the immense extent of country to be reclaimed by the practice of this art, makes it of importance not only to the arid regions, but to the whole nation that there be a wide dissemination of available information on this subject.

The great results in individual size and in general yield of crops grown are always reached by the intelligent application of water. Irrigation is more reliable than rainfall in the production of crops, as the farmer can regulate the moisture according to the necessities of each crop and the soil he wishes to treat. Oats raised in this manner weigh from thirty-eight to forty-eight pounds to the bushel, where thirty-two pounds is regarded the regular standard without irrigation. In other crops a similar result is given. Farmers who become accustomed to irrigation seldom return to farming in localities where irrigation is not practiced.

The water supplies are reliable, as they have their source high up in the hills or mountains where living springs abound, and where in most cases the snows of winter are melted during the entire summer.

The water coming down from the mountains and higher plateaus is freighted with fertilizing materials derived from the decaying vegetation and soils of these upper regions, which are spread by the flowing of water over cultivated lands. Reservoirs can be made in the many natural depressions or basins by storing the surplus water during the year, so that small streams used in this way will irrigate large tracts of land.

Wyoming lies almost wholly within the limit of the arid belt, and successful agriculture is largely dependent upon irrigation. This is not so much due to insufficient rain or snowfall as to its unequal distribution. If the moisture of the atmosphere were precipitated uniformly over all the State, it is possible that irrigation could be dispensed with, but such is not the case. The high mountains, owing to the cold atmosphere, act as great condensers, and clouds in passing over them are robbed of their moisture, leaving but little for the plains below. An area equal to about one-third of the State is included in the lofty ranges which form the culmination of the watersheds of the stream.

The lands adapted to agriculture vary in elevation from 3,000 to 7,500 feet. Between these elevations is situated nearly two-thirds of the State, with an average rainfall of nearly twelve inches. The range at Cheyenne for a period of seventeen years is about fourteen inches, the minimum being 5.03 inches in 1876 and the maximum 19.24 inches in 1883. The greatest known rainfall within the agricultural limits of the State is 31.32 inches at Fort Laramie, in 1853. This point has also the minimum record, 2.38 inches in 1860. The experiments of the State engineers and the observation of the most experienced irrigators fixed the average depth of water which must be added to the rainfall by irrigation, to secure the *greatest* yield, at two feet, this being equivalent to a duty of one cubic foot per second for eighty acres reckoning the irrigating season at 100 days.

There are, therefore, in this State over 20,000,000 acres of mountains on which water falls each year to a depth of three feet. There

is an equal or greater area of land so situated along the streams as to be susceptible of irrigation, which has the requisite smoothness and slope of surface to permit this to be accomplished readily. The problem of irrigation is to supplement the work of nature and distribute the water falling on the high mountains over these lands. It is not known how great a portion of the water falling on the mountains is lost through evaporation and sinking into underground channels, but two-thirds seems a liberal allowance for these losses, which leaves 20,000,000 acre-feet available for irrigation, and this on the duty before mentioned would suffice for the reclaiming of over 10,000,000 acres. To reach this result, however, it will be necessary to store up water which now escapes during the winter months and during the early spring floods.

Wyoming differs from nearly all of its neighbors of the arid region in the fact that its settlement and development are not the result of mining excitements and discoveries. The chief occupation of its people has been, and is yet, the care and management of the grazing and farming interests. To this fact is due the surprising agricultural development which has taken place within the past decade.

As it now stands, Wyoming is third in the area of irrigated land and second in the number and mileage of its irrigation canals.

The cost per acre for getting water to the land and preparing it for farming will vary from \$5 to \$20 per acre. An average under the conditions in Wyoming will be under \$10.

IRRIGATION PROJECTS.

The following projects are ready for settlers and detailed information can be procured by writing to the addresses given, or by applying to the Commissioner of Public Lands, Cheyenne:

Cody Canal Association, Cody, Wyo.

Big Horn Basin Colonization Company, Cowley, Wyo.

Big Horn County Irrigation Company, Basin, Wyo.

Hanover Canal Company, Worland, Wyo.

Sahara Ditch Company, Buffalo, Wyo.

North Platte Canal & Colonization Company, Wyncote, Wyo.

Boulder Lake Canal, Boulder or Rock Springs, Wyo.

Lovell Irrigation Company, Lovell, Wyo.

Wheatland Industrial Company, Cheyenne or Wheatland, Wyo.

Eden Irrigation Company, Rock Springs, Wyo.

James Lake Irrigation Company, Laramie, Wyo.

The following projects are not completed, but some of them will no doubt be able to make contracts for delivery of water at a future date, and parties desiring to settle under the canal should write them direct for specific information:

The La Prele Ditch & Reservoir Company, Douglas, Wyo.

Medicine Wheel Canal Company, Basin, Wyo.

Wyoming Land & Irrigation Company, Marquette Building, Chicago, Ill.

Lake View Irrigation Company, Cody, Wyo.

Elk Canal Company, Lovell, Wyo.

Tensleep & Bonanza Canal, 645 Cass St., Milwaukee, Wis.

Thermopolis Irrigation & Investment Company, Thermopolis, Wyo.

Other companies having projects under way not yet sufficiently advanced to warrant settlement are:

Big Horn Basin Development Company, Cody, Wyo.

Western Land & Irrigation Company, Saratoga, Wyo.

North Platte & Encampment Canal Company, Encampment, Wyo.
 Hubbard Canal Company, First National Bank Building, Cheyenne, Wyo.
 The Green River Land & Irrigation Company.
 Green River Canal Company.
 McDonald Canal.
 Hawk's Spring Canal.
 Utah & Wyoming Canal & Reservoir Company.
 Carbon County Land & Irrigation Company, Cheyenne, Wyo.

AGRICULTURE

SOIL AND CLIMATE CONDITIONS.

Wyoming is rich in agricultural possibilities, and increased attention is being given farming in all its branches.

The lands are generally slightly rolling, very accessible, easily broken to plow and quite free from stones or other obstructions.

In the valleys the soil is generally a black loam, in some places a red gypsum, and on the benches, plateaus and slopes a sandy loam.

Wherever the altitude is less than 7,500 feet the climate is sufficiently mild and warm to develop crops usually grown in the Northern and Western States.

Tame grasses, alfalfa, clover, wheat, oats, barley, rye, some corn, potatoes, roots generally, melons and all garden vegetables, berries, small fruits, etc. are being grown successfully and very generally; immense crops of hay are gathered, and broom corn, sorghum and standard apples of excellent growth and quality have been grown and exhibited at Wyoming State and county fairs. The vegetables and grains shown at these fairs are not surpassed in yield per acre or in size.

AVERAGE WYOMING CROPS.

The following is the average per acre of those crops upon which authentic reports have been obtained:

Alfalfa, per cutting (two cuttings).....	2½ tons
Timothy.....	2 tons
Native and other hays.....	1½ tons
Potatoes.....	201 bushels
Onions.....	45 tons
Parsnips.....	30 tons
Carrots.....	25 tons
Beets.....	35 tons
Sugar beets.....	22 tons
Turnips.....	40 tons
Tomatoes.....	190 bushels
Cucumbers.....	133 bushels
Peas.....	50 bushels
Beans.....	22 bushels
Pumpkins, number per acre.....	950
Squash, number per acre.....	1,769
Watermelons, number per acre.....	1,115
Muskmelons, number per acre.....	1,112
Cabbage.....	2,719
Cauliflower.....	4,000
Wheat.....	30 bushels
Barley.....	25 bushels
Rye.....	20 bushels
Oats.....	50 bushels
Corn.....	20 bushels
Raspberries.....	962 quarts
Strawberries.....	6,920 quarts
Cherries.....	4,356 quarts
Blackberries.....	9,500 pounds
Currants.....	21,000 pounds
Gooseberries.....	29,000 pounds

The table following indicates the average yield per acre and the farm value of the leading Wyoming crops:

CROP	ACRES PLANTED	AVERAGE YIELD PER ACRE	AVERAGE PRICE PER BUSHEL
Corn.....	3,000 acres	25 bushels	70 cents
Spring wheat.....	30,000 acres	28.5 bushels	77 cents
Oats.....	30,000 acres	37 bushels	53 cents
Barley.....	4,000 acres	32 bushels	54 cents
Rye.....	400 acres	23 bushels	66 cents
Potatoes.....	5,000 acres	200 bushels	74 cents
Hay.....	250,000 acres	2.1 tons	\$7.50 per ton

Wyoming produced more oats than either Utah, Nevada, Louisiana, New Mexico or Arizona, more barley than Missouri or New Mexico. Wyoming produced an average of 2.10 tons per acre of hay, which was greater than the yield in Iowa, 1.40 tons; Nebraska, 1.50 tons; Missouri, 1.40 tons; Kansas, 1.15 tons; Texas, 1.30 tons; Montana, 1.70 tons; Nevada, 1.74 tons; California, 1.75 tons; and New Mexico, 2.05 tons per acre.

In Irish potatoes Wyoming's yield was 25 per cent greater per acre than Colorado, Montana or Washington and double that of Utah. Note that the average yield in Wyoming was 200 bushels.

ALFALFA.

In Wyoming the State has made no attempt to collect statistics and it is not possible to correct the returns of the late census to bring them up to date. In 1899, 74,688 acres of alfalfa were grown in the State. Since that time the area has been greatly increased, especially at the higher altitudes where farmers have more recently learned that this forage crop can be grown with success. It is safe to say that more than 100,000 acres of alfalfa are harvested each season, producing approximately 275,000 tons of hay.

The altitude of all the agricultural land in Albany, Carbon, Sweetwater and Uinta Counties is above 6,000 feet and there are considerable areas, as the Laramie Plains in Albany County, over which the land is between 7,000 feet and 8,000 feet above the sea. Much of the arable land in Big Horn and Sheridan Counties has altitudes between 3,000 and 4,000 feet. There are considerable areas in Laramie, Converse, Weston, Crook, Johnson and Fremont Counties with altitude close to 5,000 feet. Irrigable lands in other parts of the State have elevations ranging between the extremes mentioned.

This article is based on data furnished by Mr. B. C. Buffum, director of the Wyoming Experiment Station, Laramie, Wyoming. Alfalfa is at home, says Mr. Buffum, in the arid region and naturally thrives under irrigation. This forage plant is destined to be the greatest crop of the West. It finds everything in its favor in Wyoming and the area devoted to it is rapidly increasing. There are two things which account for the comparatively small acreage of alfalfa in the State at this time. The first is that the agricultural development of Wyoming is only fairly begun. In the development of its farm interests Wyoming may be said to be the newest of the Western States. Twelve or fifteen years ago the great range stock business

began to be crowded and the grazing industry gave way to farms upon which the greater amount of land was irrigated to increase the production of native hay. At the present time farming is just beginning to take its present form, combining cultivation of the land with the grazing of live stock on adjacent range areas. In northern Wyoming the culture of alfalfa was begun between 1885 and 1890, and the plant was introduced into the southern part of the State about the year 1891.

The other reason that its cultivation has been slowly extended is the statement which has so often been made and is persistently adhered to by many writers at the present time, that "alfalfa thrives up to altitudes of 6,000 feet." This leaves the impression with the otherwise uninformed that alfalfa will not do well in localities above 6,000 feet. The average altitude of the agricultural lands in Wyoming is close to 6,000 feet, and there is as much land above this elevation as there is below it. There are large areas which are more than 7,000 feet above sea level. Those who have combined farming and stock raising at this high altitude are as thrifty and prosperous as are men who are following such occupations at the lower levels. But it has been necessary to explode the theory that alfalfa would not produce at high altitudes. This has taken time, but by actual demonstration on a practical scale it has been proven that alfalfa will thrive and produce most remunerative crops even on exposed lands which are over 7,000 feet above sea level. This fact is just beginning to be recognized by farmers in Southern Wyoming. There are now a number of luxuriant fields of alfalfa on the Laramie Plains which have produced over four tons of cured hay per acre in a season and which have been established long enough to demonstrate the adaptability of the plant. At elevations of 5,000 feet or less three crops are regularly secured, and in some favored localities a partial or complete fourth crop is occasionally harvested. At elevations of 6,000 feet to 7,500 feet two crops are harvested each season.

The last census placed the average yield of alfalfa hay at a little less than three tons per acre. This covers all alfalfa lands and includes areas of poor stands and poor crops from all causes. Good farmers can count on larger yields than this on well seeded land, even at the higher altitudes. Alfalfa does not seem to follow the general rule that an average crop never pays, for even two and a half or three tons of hay per acre pays better than the ordinary crops of native hay. In records made by the Experiment Station for a period extending over five years, after alfalfa began to be cultivated on a large scale, the maximum yield obtained on a measured acre was a little over nine and two-thirds tons of cured hay at Wheatland in 1894. The hay was weighed when hauled from the field ready to go into the stack. From the acre which produced this crop an average yield was obtained for three years of 8.47 tons. At Sheridan records kept for one acre for three years gave an average of seven tons of hay per season. At Laramie at an altitude of 7,200 feet an average of three and a half tons per acre was obtained for four years. These yields were from good lands, properly seeded and irrigated. Being measured when first cured the hay would

be subject to the usual shrinkage in the stack. On large areas the farmer would not expect to produce as large yields, but by following the best practice he could approximate them on his best lands.

A conservative estimate of the value of the alfalfa hay produced annually in Wyoming would be \$1,500,000. Current prices in different parts of the State range from \$4.50 to \$12 per ton, in the stack, but these figures by no means represent the total value of the alfalfa crop to the farmers. Alfalfa culture does many things for the farm in addition to producing a crop which is in itself remunerative. The plant is a natural fertilizer for arid soils. Western soils are generally rich in the mineral plant foods, and only need organic matter and nitrogen to bring them to a maximum state of production. Experiments on the Laramie Plains show that the value of the alfalfa hay from one acre of land for five years was \$100 more than the cost of producing it. Land producing potatoes and grain in rotation gave a net return from one acre of \$88 in five years.

When the alfalfa land was plowed and planted to wheat it produced \$8 to \$12 more value in wheat per acre than the same kind of land which had grown potatoes and grain in rotation before.

When the alfalfa land was plowed and planted to oats it produced \$16 worth of grain more than the same kind of land which had grown other crops in rotation.

When the alfalfa land was plowed and planted to potatoes it produced \$16 worth more of potatoes per acre than was obtained from like land which had been growing potatoes and grain in rotation.

The alfalfa land which was plowed received no other fertilizer than that due to the alfalfa itself and no fertilizers were used on the land which produced the crops in rotation.

This indicates that every acre of land in Wyoming which has been producing alfalfa for a number of years has been increasing in fertility and when used for other crops will give returns of from \$8 to \$16 per acre more than land which has been used for grain and root crops. This would add almost \$1,000,000 more to the present value of the crop of Wyoming farmers.

Growing alfalfa also solves the weed problem. By the systems of rotation in which alfalfa is used farmers have no difficulty in controlling weeds, and are not worried by Russian thistle or other pests. One of the worst pests with which the user of hay has to contend is the "Foxtail," or squirrel-tail grass in meadows. This grass will not grow in alfalfa fields, and consequently such hay is free from the dangers to stock possessed by hay containing "Foxtail." Not only this, but the growing of alfalfa on the farm creates a better system of agriculture. It establishes rotation of crops and clean culture; prevents wasteful use of irrigation water, enabling larger area to be cultivated under the water supply, and encourages better live stock which are cared for in a better way than where the range alone is used.

At present the supply of alfalfa hay falls far short of the demand. People are learning the great value of alfalfa and the loose hay commands a high price. Any one near Laramie fortunate enough to

own 100 acres well seeded to alfalfa, which would produce three tons of hay per acre, could net \$4,000 above the cost of making and marketing the hay. There are few places where a crop so easily raised would prove so remunerative to a grower. There is ready demand for a much larger amount than can be supplied. Those who feed sheep in Utah and ship them to eastern markets find it necessary to have alfalfa hay for their sheep at feeding points along the railroad in order that they may reach market in good condition. For this purpose many tons of baled alfalfa are shipped to feeding points in Wyoming from adjoining states. It is believed that the development of lamb feeding in Wyoming where farming lands will supply alfalfa and other fattening foods, and where near by ranges supply thousands of sheep for the purpose, is only a matter of a few more years of agricultural development. There will always be a good market for the hay and its value to keep up soil fertility makes alfalfa one of the most prized of our agricultural crops.

The chemical composition of alfalfa varies widely depending on the locality in which it is grown, the maturity of the plant and other circumstances, but all analyses show high percentages of those nutrient compounds which give it such value as hay. Experiments have shown that these nutritious compounds in alfalfa are easily digested and made use of by animals. This is especially true of the nitrogen compounds or proteins which form the more valuable part of a ration and which are essential to build up the growing parts of animals. Taking an approximate average of the analyses made by Headden, it is found that the number of pounds of digestible nutrients in 100 pounds of hay are as follows:

Dry Matter in 100 pounds 92; Protein, 11.1; Carbohydrates, 37.3; Ether Extract, .62; Nutritive Ratio, 1 to 3.5.

It is instructive to compare the composition and feeding value of alfalfa with the best native hay and with timothy which has long been considered the standard hay with which to compare other roughage. The following table gives the amounts of digestible nutrients in 100 pounds:

DRY MATTER	PROTEIN	CARBOHYDRATES	ETHER EXTRACT	NUTRITIVE RATIO
Alfalfa.....92	11.1	37.3	0.63	1 to 3.5
Best Native Hay.92	4.5	50.0	1.2	1 to 13.0
Timothy.....87	2.8	43.4	1.4	1 to 16.6

It will be seen that the best native hay contains less than one-half as much protein as is contained in alfalfa, and timothy only contains about one-fourth as much. The nutritive ratio between the protein and the carbohydrates and ether extract is far too wide in the native hay or the timothy for young or fattening stock and where they are fed it is of great advantage to feed alfalfa along with them to increase the amount of protein in the ration. In his Wyoming experiments with feeding lambs alfalfa and native hay Foster showed that the alfalfa fed lambs made 27.8 per cent larger gains, that they made 1½ per cent more of dressed carcass, and that the gains were made with 15 per cent less cost for food per 100 pounds than with native hay. Alfalfa produced 1,280 pounds more mutton per acre than native

hay. When native hay was fed it took 793 pounds of food for 100 pounds of gain in flesh at a cost of \$4.48. When alfalfa was fed it took 750 pounds of food for 100 pounds gain at a cost of \$3.89. In these experiments the native hay gave a return in value of mutton produced of 44 cents per acre and the alfalfa gave a return of \$14.44 per acre. It is pointed out that this comparison is for young growing animals and the difference between the two kinds of hay might not be so great with old sheep.

There is a rapidly growing demand in Wyoming for alfalfa on farms, in cities and by lamb and cattle feeders. There is no danger of a glut in the alfalfa market. With a rational system of rotation to secure continued fertility and maximum yields not less than one-third the land used for general crop production should be seeded to alfalfa. It is estimated that there are about 2,000,000 acres under ditch in the State, but less than one-half of this is irrigated for the production of native hay and other crops, and less than one-fourth is under any form of cultivation. Of this smaller area not more than one-eighth is now growing alfalfa. If it could all be consumed and economically used there is probably enough water supply in Wyoming to reclaim 10,000,000 acres of land. On the present cultivated area the alfalfa acreage should be doubled and with future agricultural development it may be increased almost indefinitely. At the present time there is room for many new hay farms. Well conducted farms for the production of alfalfa hay alone bring good return on the investment in many parts of the State.

The most important fertilizer for the arid region is nitrogen.

Some plants, of which alfalfa is one, have the power to fix in the soil free nitrogen of the air. They do this by means of micro-organisms which form bunches of nodules on the roots.

Therefore growing alfalfa on the land increases the amount of nitrogen in the soil and practically solves the fertilizer problem for the West.

Alfalfa also improves the soil tilth by shading the ground and adding humus to the soil by the decay of its large, deep-growing roots.

Growing alfalfa destroys weeds.

The value of alfalfa harvested from one-half acre of land for five years at Laramie was about \$50 more than the cost of producing it.

The value of potatoes and grain from an adjoining half acre for five years was about \$44 more at local prices than the cost of producing.

When the alfalfa land was plowed and planted to wheat it produced \$8 to \$12 more value in wheat per acre than the land which had grown potatoes and grain before.

When alfalfa land was plowed and planted to oats it produced \$16 worth of grain more than land which had grown potatoes and grain before.

When alfalfa land was plowed and planted to potatoes it gave \$16 worth more of potatoes per acre than was obtained from land which had grown potatoes and grain before.

By growing alfalfa, the above increase of yields and values were produced with absolutely no cost for fertilizing the land.

HORTICULTURE

FRUIT GROWING.

The friction of starting is greater than the friction of movement. While Wyoming has no extensive fruit farms as yet, enough has been done to indicate what is possible and to demonstrate that there is no irrigated agricultural land in the State which will not produce profitable crops of some kinds of fruit. The planting of fruits, which was begun on a small scale but a few years ago, is rapidly growing in favor. No branch of agriculture, perhaps, is advancing with more rapid strides than fruit growing. At the present rate of increase, the production of fruits for home consumption will soon be of great importance to the State. It must be remembered that Wyoming still belongs to the newer part of the West, and much of its industry is such as is still making use of materials already on hand, rather than forcing the soil to produce artificially. The establishment of irrigated farms and the greater production of diversified agriculture marks the dawn of a true and lasting prosperity. The first farming was naturally such as furnished an increased amount of food for live stock, and the more staple farm crops. Fresh, ripe fruits, as distinguished from the dried and tin-can varieties, which have indeed been rare luxuries upon the scattered ranches, are rapidly becoming necessities in progressive homes. The regime of the wandering hunter and trapper, the shifting pioneer population and the nomadic stockman has passed, and the population is made up of a happy, contented, home-building people, surrounding themselves with comforts and luxuries and providing for the comfort of generations to come. Agriculture and horticulture are becoming permanent and staple. The soil's fertility is being kept up, in place of being robbed of its great natural wealth of plant food. Fruit plantings are lasting and will yield their returns through future years. With irrigation and the intelligent use of improved farm methods, the crop yields are above the ordinary, the quality of the produce is unexcelled, and years of failure are so rare as not to be taken into account at all.

Conditions of soil, climate and exposure in Wyoming vary greatly. In a few localities, where the annual rainfall is greater than fifteen inches, or where the lands are underlaid with surface water at no great depth, fair crops are raised without irrigation. We have agricultural lands at altitudes of less than 3,500 feet, and from this to over 7,000 feet above sea level. There are wind-swept plains, rolling uplands, protected mountain valleys, and bottoms along streams, with corresponding length of growing seasons free from frost of from eighty days or less to more than 150 days, and the mean annual temperature varies from 40° F. to about 50° F. On account of these widely varying conditions, the fruits raised, the place where they are to be planted, the methods of treating them, must be determined largely by each person for himself. There is a wide range of kinds and varieties from which to choose that will succeed in this latitude and the success with which certain kinds have been grown in the different parts of the State will aid in making the choice.

The most extensive fruit trials of which there are authentic records are those made upon the several experiment farms in different portions of the State. In addition to these trials, however, are the important results obtained by farmers and ranchmen themselves, who have been producing fruit for a number of years. There are now bearing orchards in Fremont, Sheridan, and Laramie Counties, and more scattered trees fruiting in nearly every section of the State. The first trees were set out from 1882 to 1885. The first planting upon the experiment farms was made in 1892. Russian apricots and some varieties of pears have produced thrifty trees and seem hardy.

Undoubtedly for some time the home demand will be greater than the supply. This gives the Wyoming fruit grower a decided advantage over growers in old well-established fruit belts. He will not need to place his fruits in competition with those in the general market, and the expense of shipping precludes serious competition from growers in other States in many kinds of fruit which he can successfully raise at home. He can supply his own home much more cheaply than he can buy inferior products from elsewhere, and his surplus will find ready sale in home markets.

APPLES.

The hardy varieties of apples succeed in all parts of the State. Mr. Jacob Lund has successfully fruited the Wealthy apple at about 7,400 feet altitude on the Laramie Plains. Several varieties of crabs are also being raised above 7,000 feet. Mr. J. S. Meyer and Mr. Edward Young, in Fremont County, have produced large amounts of fruit from their orchards every season for the last seven or eight years. The principal varieties which have succeeded with them are the Wealthy, Duchess of Oldenburg, Yellow Transparent, Briar Sweetcrab, Transcendant Crab, Great Lakes Siberian Crab, Martha Crab, Soulard Crab, and Montreal Beauty Crab. The Ben Davis also fruited upon the Lander Experiment Farm. In Sheridan County Mr. C. H. Manning has a large bearing orchard, consisting principally of the following varieties: Yellow Transparent, Antonovka, Tetofsky, Moscow, Enormous, Hibernial, Wealthy, McMahon, Switzer, Plum Cider, Red Astrachan, Wolf River and Gideon. He says he has had good crops every year since the trees were old enough to bear, and that all these varieties are hardy except the Plum Cider.

In Laramie County the Ben Davis, Oldenburg, Wealthy, Pippin and Northern Spy, as well as a number of varieties of crabs, are bearing. There are no accurate data of the yields obtained from apples other than that they have borne full crops and that years of failure are rare.

PLUMS.

The native wild plum is found over the larger portion of the State. The best cultivated sorts tried are the De Soto, Weaver, Hawkeye, Wolf, and Rolling Stone varieties, all of which have borne fruit.

CHERRIES.

The best varieties are the English Morello, Early Richmond and Dwarf Rocky Mountain. They evidently will succeed in all parts of the State, and the last named is especially prolific. Mr. G. W. Barlow of Sheridan estimates that his Dwarf Rocky Mountain cherries, set eight by ten feet, yielded an average of eight quarts per plant, which would be 4,356 quarts per acre.

BERRIES.

The strawberry is the most cosmopolitan of all fruits, and it seems to succeed under all conditions existing in Wyoming if properly cared for. Some varieties succeed better than others under local conditions, but a few standard sorts, such as Crescent, Wilson, Jucunda, Captain Jack, etc., seem to adapt themselves to widely different conditions. The best variety for any locality must be determined by experiment. At Sheridan 11,645 quarts of Jucunda Improved berries have been gathered from an acre of plants.

Currants and gooseberries succeed in all parts of the State, if given half a chance, though gooseberries do not seem to do as well at high altitudes as currants. Mr. James King has raised some fine crops of Red Cherry and White Grape currants upon the Laramie Plains. These varieties and the Crandall, which is the finest black sort, are the best of the varieties which have been tried for all parts of the State. At Wheatland, White Grape yielded at the rate of 9,075 pounds per acre, Red Cherry 14,520 pounds and Crandall 32,670 pounds.

At Lander White Grape currants yielded at the rate of 11,507 quarts per acre, and Red Cherry 7,260 quarts.

The best varieties of gooseberries are the Downing and the Houghton. The Industry has also given excellent results at Sheridan. At Wheatland the Downing yielded at the rate of 21,780 pounds per acre, and the Houghton at the rate of 16,335 pounds per acre. Downing gooseberries at Lander yielded 13,159 quarts per acre.

The dewberries seem to succeed better than the blackberries at high altitudes. The canes of blackberries and dewberries, as well as those of raspberries, must be covered with earth for winter protection. The Early King seems to be the best variety of blackberry tried. It yielded at the rate of 9,525 pounds per acre at Wheatland. This variety was the most prolific at Lander also.

Raspberries have succeeded somewhat better than blackberries. At Wheatland, Thompson's Early Prolific, which did better than any other kind, yielded at the rate of 6,808 pounds per acre. At Sheridan the raspberries gave large crops each year, but the varieties were somewhat mixed, so comparative results are not of much value.

GRAPES.

Grapes will probably not succeed much above 5,500 feet altitude, unless they can be given more than ordinary protection. Some varieties have been fruited at Sheridan, and the early varieties planted at Lander have made excel-

lent growth and are now producing fine crops. The Wyoming Red and Concord have been heaviest yielders and have shown that they will ripen before early frosts. Grapes merit more extended trial than they have had, especially in sheltered localities.

FRUIT GROWING WITH IRRIGATION.

While much has been said of the advantages of farming under irrigation, over farming in pluvial districts, these advantages are not appreciated as they should be. We hear of the disadvantages of raising crops by irrigation only from those who are unacquainted with it in actual practice. Many who barely exist upon unirrigated farms can not understand how the additional expense of applying water is to be met, and it could not be if an increased crop production did not more than pay all the added expense. Those who have farmed under good irrigation systems would be loath to return to rainfall conditions and take the years of failure, or the lower yield, with good grace.

Late frosts, which would be destructive to fruit buds and flowers, may be quite effectually prevented by keeping the ground well soaked, and water in the furrows on nights when there is danger of frost.

The irrigated orchard bears its full crop of fruit every season, instead of resting every other season, or two seasons out of three. The quality of the crop is improved by the application of water just when it is needed, and in a dry climate there is little danger of too much water being forced on the plants during the fruiting season. Naturally the quality of the fruit is improved as well by the large amount of sunshine, which gives it the highest colors, and materially aids in the ripening and sweetening process.

In good irrigation practice, the soil fertility is never lessened by leaching. In fact, fertility is conserved to the greatest possible extent, and most irrigation waters add plant foods to the soil. It has been demonstrated that water carrying quantities of sediment adds to the total amount of plant food in the soil regardless of the crops removed each year. In such places artificial fertilizers will never be needed, while the production may be as constant as in the famous valley of the Nile.

The time of irrigation, when the soil and plants are in need of water, and the amount to be applied, along with the best methods of applying it, are matters whose correct solution requires careful and intelligent thought and study of every fruit-grower. They must be determined largely by each individual for the conditions of soil and climate in his locality.

SALE OF NURSERY STOCK.

The report of the State Board of Horticulture for 1908 gives the following:

"In the following table summarizing the sales of nursery stock in Wyoming, there is included very little of the stock that was produced and sold by our local nurserymen. Most of such stock was delivered directly to the customers from the nursery and often no permanent record made.

"The list is also far from complete in respect to the stock received from outside firms. So many of the nurseries have failed to keep a separate

shipping book for their Wyoming trade that it has put them to no little trouble to supply the information required. Probably not more than two-thirds of the sales have been so recorded that they could be found and supplied to this office. One may, therefore, suppose that the following figures may be increased from one-fourth to one-half and still be conservative as to the extent of the trade in nursery stock in this State."

Standard apples.....	49,784	Strawberries.....	151,918
Apple grafts.....	14,000	Grape vines.....	2,092
Crabs.....	7,664	Mulberries.....	2,112
Pears.....	2,942	Cherry-plum, June berry, etc.....	1,585
Peaches.....	916	Hedge.....	3,437
Plums.....	12,673	Roses.....	2,870
Cherries.....	11,528	Rhubarb, asparagus, etc.....	4,667
Quinces.....	10	Shade tree cuttings.....	17,946
Apricots.....	147	Seedlings (mostly shade trees).....	17,638
Raspberries.....	17,172	Shade trees (all kinds).....	159,707
Blackberries.....	7,992	Evergreens.....	2,382
Currants.....	12,116	Ornamental shrubs, Herbaceous	
Gooseberries.....	12,709	perennials, etc.....	10,951

The State Auditor gives the following table of valuation on lands and improvements for 1908:

COUNTY	LAND AND IMPROVEMENTS		TOWN LOTS AND IMPROVEMENTS
	ACRES	VALUATION	
Albany.....	1,097,134.00	\$1,418,973.00	\$1,159,720.00
Big Horn.....	296,485.05	1,246,515.00	794,284.00
Carbon.....	1,301,690.00	1,493,277.00	1,168,992.00
Converse.....	290,187.00	589,271.00	393,325.00
Crook.....	353,998.80	947,015.29	140,233.65
Fremont.....	180,884.00	941,002.00	872,047.00
Johnson.....	220,006.51	824,939.02	315,172.00
Laramie.....	1,140,935.67	2,174,788.55	2,139,629.00
Natrona.....	128,788.72	393,382.64	397,943.00
Sheridan.....	259,657.00	1,424,974.50	1,320,956.00
Sweetwater.....	1,748,937.00	619,799.85	637,324.00
Uinta.....	998,342.00	1,325,874.00	805,738.00
Weston.....	149,365.50	464,939.08	145,480.00
Totals.....	8,166,411.25	\$13,864,750.93	\$10,290,843.65

STOCK RAISING

DEVELOPMENT OF THE INDUSTRY.

The live stock industry of Wyoming, which for a long time was its only industry, has a history as varied and romantic as a sixteenth century tale. When the country now comprised in this State was first discovered, a luxuriant grass covered the prairies, upon which nothing but buffalo and wild game grazed. The first herds were gathered and reared by men who preceded the first attempts at actual settlement of the territory. Lying in the pathway of that great migration to the Pacific Coast, which began in the middle of the past century, the territory was necessarily traversed by countless long trains of ox-teams, many of which, through accident or disease, were destined never to reach their journey's end. Sick, injured, footsore and poor, these animals were abandoned to live as best they might or become a prey for the wild animals of mountain and plain. That many of them lived through the winter following and were fat enough for beef in the early

spring-time, proved a revelation to the man accustomed to long and expensive winter feeding, and forced his attention to the fact that the mountain grasses must possess nutritious qualities of marvelous worth. To raise cattle, horses and sheep was, for the earliest settlers, an easy matter, but to keep them was quite a different proposition, for the Indian had little respect for the rights of ownership and no horse was safe beyond the reach of a bullet from his owner's trusty rifle. When the white man came to stay he brought vast herds of cattle that thrived upon the open ranges without care or attention, on the strong and nutritious grasses. Fast following on these early days of settlement, of danger and accumulation, came the "boom" in the cattle business during the '80s, marked by the investment of millions of dollars by men who knew nothing of the business in which they so recklessly embarked. About 1886-7, settlers having fenced in the rivers and creeks, thus cutting off the winter shelter, and the range having been overstocked, this, together with an exceptionally hard winter and short feed, caused disaster and reduced a profitable business to bankruptcy. The period of unwarranted speculation, fancy prices and extravagant waste was of short duration, and naturally enough was followed by a rapid depression of prices and the consequent failures of the inexperienced. And yet, deplorable as were the results, this bitter experience teaches no new lesson in domestic economy; neither does it in any way detract from the material advantages which this State offers to anyone who would embark in stock-raising as a legitimate enterprise.

Following this appeared the ranchman of moderate means, having smaller herds of cattle, who had learned from bitter experience that feed must be provided for severe winters. Thus ranches were settled and irrigated—alfalfa, hay and other feed provided, rendering the business that was formerly so precarious a safe and steady avocation, and one that is rapidly giving the people wealth and independence.

The live stock industry has been the most remunerative business of this section of the West; mining and agriculture are fast becoming close competitors. As to which branch of the business—cattle, sheep, or horses—one should adopt, no advice can be given. One should follow that for which he is best adapted. Large fortunes and many comfortable competencies have been and are being made in each branch.

CATTLE.

The question has often been asked, "What is the best animal to purchase for cattle?" That can be answered by the advocates of each breed, and has been settled to the satisfaction of each advocate that his particular animal is the best suited for the range and pasture. But it can be said that all "beef" breeds do well—beef is the main object of cattle-growing in this State. Many claim that the Hereford is a hardier animal and a better "rustler" after feed during the winter than any other breed, and they are much in favor with those who have used them. Others claim for the Shorthorns that they are as good, will stand as much hardship and go through the win-

ter just as well and will give more beef per animal. Some Galloways and a few Polled Angus have been brought into the State. Each has done well, neither has come into general use.

Statement of the total valuation of property within the State of Wyoming, and the number of cattle and sheep and the valuation thereof for the following years:

YEAR	TOTAL VALUATION	NUMBER CATTLE	VALUATION	NUMBER SHEEP	VALUATION
1886.....	\$31,020,784.00	898,121	\$14,651,125.00	308,997	\$ 469,825.75
1887.....	32,089,613.00	758,448	10,186,362.00	421,788	637,438.50
1888.....	33,338,541.00	724,737	8,153,712.00	407,517	750,918.00
1889.....	31,431,495.00	623,283	7,014,661.00	459,991	794,557.00
1890.....	30,665,197.00	582,669	5,942,745.00	476,214	760,871.75
1891.....	32,536,400.00	527,683	5,384,239.00	550,368	931,763.00
1892.....	32,357,500.00	428,823	4,654,379.00	639,205	1,204,787.50
1893.....	32,356,801.96	402,231	4,108,272.00	785,453	1,550,438.75
1894.....	29,198,041.20	334,724	3,460,964.00	881,695	1,335,731.75
1895.....	29,838,938.79	300,264	3,473,124.50	1,172,810	1,762,606.00
1896.....	30,028,694.65	297,240	3,732,558.00	1,308,063	2,317,084.50
1897.....	30,300,462.31	298,697	4,020,548.00	1,391,795	2,506,286.00
1898.....	30,789,291.74	280,102	4,361,483.00	1,597,202	2,913,164.95
1899.....	35,578,806.49	311,629	5,412,792.00	2,164,701	4,380,681.65
1900.....	37,892,303.81	359,069	6,154,640.05	2,624,689	5,426,493.25
1901.....	39,581,216.55	402,574	6,902,311.00	2,868,711	5,737,219.50
1902.....	43,348,356.00	487,489	8,175,072.00	3,796,318	6,777,606.05
1903.....	44,689,941.34	512,659	6,850,877.00	2,796,226	5,322,074.00
1904.....	46,696,948.75	469,632	7,908,098.00	2,631,468	5,211,839.65
1905.....	48,826,940.55	524,768	7,420,885.50	2,658,450	5,583,587.85
1906.....	51,223,202.87	508,075	7,233,427.00	2,874,686	6,077,536.50
1907.....	64,419,177.98	513,657	7,175,645.00	3,329,663	8,702,167.50
1908.....	67,580,051.12	501,190	7,066,728.00	3,337,339	8,854,156.50

SWINE.

The following table gives the number of swine in the State for the years 1902 and 1908:—

COUNTY	1902		1908	
	NUMBER	VALUATION	NUMBER	VALUATION
Albany.....	40	\$ 160.00	245	\$ 1,250.00
Big Horn.....	718	2,872.00	1,457	7,285.00
Carbon.....	110	542.00	315	1,575.00
Converse.....	146	588.00	163	815.00
Crook.....	205	820.00	786	3,935.00
Fremont.....	42	168.00	287	1,445.00
Johnson.....	256	1,024.00	563	2,840.00
Laramie.....	903	3,612.00	862	4,310.00
Natrona.....	56	224.00	153	775.00
Sheridan.....	655	2,620.00	1,473	7,365.00
Sweetwater.....	2	8.00	7	35.00
Uinta.....	33	348.00	461	2,085.00
Weston.....	134	540.00	617	3,085.00
Totals.....	3,300	\$13,526.00	7,389	\$36,800.00

SHEEP.

Since 1883 the sheep industry has grown enormously, and many heretofore poor men have become rich, some owning as many as 65,000 head.

Sheep are grazed in the mountains in the summer, and in the winter upon the plains, where they find the cured grass, as Nature provides it, together with the browse furnished by the sagebrush. A sheep man needs no ranch, and makes no preparations in the way of harvested feed for the winter, but, like Abraham of old, moves about with his flocks, in the summer living in tents in the cool shades of the mountains, and in winter in a "sheep wagon," which is fully equipped with spring bed, stove and kitchen outfit. Sheep are subject to no disease except scab, which is easily cured with proper attention. The wool, at fifteen cents per pound, a little more than pays all the costs of running the sheep a year, so that the increase and mutton are the accumulated net profit.

Wyoming leads all the western States and Territories in the price per head of its sheep, and leads every State in the Union in the total value of its sheep, the number and value of its lambs, the amount and value of its wool clip, and the average weight of fleece produced.

COUNTY	NUMBER	VALUATION
Albany.....	156,209	\$ 698,940.00
Big Horn.....	410,106	1,846,477.00
Carbon.....	647,210	2,963,455.00
Converse.....	491,508	2,212,786.00
Crook.....	246,562	1,109,529.00
Fremont.....	447,815	2,015,168.00
Johnson.....	388,734	1,749,602.00
Laramie.....	158,908	715,086.00
Natrona.....	733,765	3,303,042.00
Sheridan.....	167,067	751,802.00
Sweetwater.....	516,413	2,273,859.00
Uinta.....	463,556	2,086,002.00
Weston.....	303,329	1,364,981.00
Total for 1908.....	5,131,182	\$23,090,719.00
Total for 1907.....	4,522,278	\$20,350,301.00

The State Board of Sheep Commissioners gives the following interesting statistics in its report for 1908 of the number and value of sheep in Wyoming January 1, 1908, as compared with 1907:

1907	NUMBER	VALUE
Sheep in Wyoming on January 1, 1907.....	4,023,560	\$16,104,380.00
Breeding ewes.....2,212,958		
Percentage of increase during 1907, 72 per cent.....	1,592,609	
Sheep and bucks imported during 1907.....	272,809	1,480,426.00
	5,888,978	
Sheep and lambs exported during 1907.....	1,366,700	6,491,825.00
Sheep on hand January 1, 1908.....	4,522,278	\$20,350,301.00
Average value of sheep on the range.....		4.50
Average value of sheep exported.....		4.75

1908	NUMBER	VALUE
Sheep in Wyoming January 1, 1908.....	4,522,278	\$20,350,301.00
Breeding ewes.....2,487,252		
Percentage of increase during 1908, 57 per cent.....	1,416,734	
Sheep and bucks imported during 1908.....	96,415	482,075.00
	6,035,427	
Sheep and lambs exported during 1908 (estimate).....	904,245	3,843,041.25
Sheep in the State January 1, 1909.....	5,131,182	\$23,090,719.00
Average value of sheep on the range.....		4.50
Average value of sheep exported.....		4.25

The exports of sheep and wool during the year 1908 as compared with 1906 and 1907 were as follows:

SHEEP AND LAMBS.	NUMBER	VALUE
Number of sheep and lambs exported in 1906.....	1,444,399	\$6,138,695.75
Number of sheep and lambs exported in 1907.....	1,366,700	6,491,825.00
Number of sheep and lambs exported in 1908 (est.).....	904,245	3,843,041.25
WOOL.	NUMBER	VALUE
Pounds of wool in 1906.....	32,849,750	\$7,253,225.00
Pounds of wool in 1907.....	33,637,000	7,811,773.00
Pounds of wool in 1908.....	37,213,024	6,004,084.00

Sheep were first introduced into Wyoming by Messrs. Durbin Brothers of Cheyenne, who, in 1870, trailed 800 New Mexican sheep through Colorado to the vicinity of Cheyenne for slaughter. In 1871 Messrs. Durbin Brothers imported 1,500 head, and these sheep were the first ever dipped in Wyoming for scabies. The dipping vat was located three miles west of Cheyenne, and Stanton tobacco and sulphur was the medicine used.

The following table shows the progress of the industry in Wyoming:

YEAR	NO. OF SHEEP.	WOOL PRODUCTION.	VALUE.
1870.....	800	.....	.....
1871.....	1,700	.....	.....
1873.....	3,800	20,000	\$ 3,800.00
1875.....	4,000	.....	.....
1878.....	9,000*	.....	.....
1880.....	23,000	.....	.....
1885.....	120,000	.....	.....
1890.....	165,000	.....	.....
1891.....	204,000	.....	.....
1892.....	459,000	.....	.....
1893.....	810,000	.....	.....
1894.....	1,198,567	9,861,811	.....
1895.....	1,222,538	.....	.....
1896.....	1,296,134	10,369,134	No authentic
1897.....	1,533,620	11,885,555	figures
1898.....	1,703,338	13,626,704	obtainable.
1899.....	2,130,143	16,508,609	
1900.....	2,780,546	21,549,231	3,733,404.00
1901.....	3,580,856	26,856,420	3,810,926.00
1902.....	4,614,750	34,610,000	5,693,345.00
1903.....	4,100,000	28,700,000	4,500,160.00
1904.....	3,800,000	29,450,000	4,859,250.00
1905.....	4,500,000	31,500,000	7,056,000.00
1906.....	4,531,000	32,849,000	7,253,225.00
1907.....	4,484,931	33,637,000	7,211,773.00
1908.....	4,651,628	37,213,024	6,004,084.00

*Almost completely wiped out by storm.

HORSES.

It has been proven beyond question that horses raised on the foot-hills and mountains, in the pure light air of an elevation of from 5,000 to 10,000 feet, have better lungs, stronger and better developed bone and muscle, and tougher hoofs, than horses from any other country. This is borne out by the fact that not only the United States Government, during the Spanish War and since, but the English Government, for service in South Africa, have purchased as many thousand head of horses in Wyoming as could be obtained.

No horse in the world can compete with the Wyoming horse in endurance of all kinds of hardship to which horse-flesh is subjected by man. This is a broad statement, but it is made without fear of refutation; every horse-man and horse in the State stands ready to back it up.

LIVE STOCK ON TAX ROLLS.

The following statement shows the number of horses listed for taxation, with the tax valuation, for 1902 and 1907 in each county:

COUNTY	1902		1907	
	NUMBER	VALUE	NUMBER	VALUE
Albany.....	7,450	\$ 130,925.00	6,922	\$ 151,205.00
Big Horn.....	13,669	241,493.00	13,256	333,289.00
Carbon.....	6,254	247,042.00	6,383	162,527.00
Converse.....	5,997	83,545.00	7,629	161,072.00
Crook.....	7,708	118,645.00	10,296	229,013.00
Fremont.....	7,640	124,053.00	6,839	171,023.00
Johnson.....	6,949	101,974.00	6,854	164,441.00
Laramie.....	10,517	165,704.00	10,048	250,270.00
Natrona.....	3,961	76,614.00	4,636	117,704.00
Sheridan.....	6,733	127,120.00	7,092	198,309.00
Sweetwater.....	1,099	33,977.00	1,360	47,117.00
Uinta.....	6,493	144,210.00	7,755	237,393.00
Weston.....	3,870	65,901.00	5,355	115,149.00
Totals.....	88,340	\$1,550,903.00	94,425	\$2,338,512.00

The following statement shows the number of mules listed for taxation, with tax valuation, for 1902 and 1907, in each county:

COUNTY	1902		1907	
	NUMBER	VALUE	NUMBER	VALUE
Albany.....	60	\$ 2,490.00	86	\$ 3,505.00
Big Horn.....	118	5,185.00	151	4,610.00
Carbon.....	83	3,044.00	70	3,295.00
Converse.....	29	1,345.00	82	4,380.00
Crook.....	66	2,973.00	99	5,515.00
Fremont.....	23	1,270.00	35	2,455.00
Johnson.....	27	1,155.00	58	3,560.00
Laramie.....	86	3,570.00	170	8,630.00
Natrona.....	42	1,425.00	37	1,675.00
Sheridan.....	38	1,925.00	73	3,920.00
Sweetwater.....	15	4,445.00	51	2,435.00
Uinta.....	72	2,615.00	62	3,380.00
Weston.....	68	1,805.00	63	1,520.00
Totals.....	727	\$33,247.00	1,037	\$48,880.00

The following tables are taken from the Biennial Report of the State Auditor of Wyoming for 1907-1908:

SHOWING THE NUMBER, AVERAGE VALUE PER HEAD, AND TOTAL VALUATION OF CATTLE, AND THE TOTAL VALUATION OF ALL PROPERTY ASSESSED FOR THE YEARS 1886 TO 1908, INCLUSIVE.

YEAR	NUMBER OF CATTLE	AVERAGE VALUE PER HEAD	TOTAL VALUATION OF CATTLE	TOTAL STATE VALUATION
1886.....	898,121	\$16.31	\$14,651,125.00	\$31,020,784.00
1887.....	758,448	13.43	10,186,362.00	32,089,613.00
1888.....	724,737	11.11	8,153,712.00	33,338,541.00
1889.....	623,283	11.09	7,014,661.00	31,431,495.00
1890.....	582,669	10.19	5,942,745.00	30,665,197.00
1891.....	527,683	10.20	5,384,239.00	32,536,400.00
1892.....	428,823	10.20	5,654,379.00	32,257,500.00
1893.....	402,231	10.21	4,108,272.00	32,356,801.96
1894.....	334,724	10.33	3,460,964.00	29,198,041.20
1895.....	300,264	11.56	3,473,124.50	29,838,938.79
1896.....	297,240	12.56	3,732,558.00	30,028,694.65
1897.....	298,697	13.46	4,020,548.00	30,300,462.31
1898.....	280,102	15.93	4,361,843.00	30,789,291.74
1899.....	311,629	17.38	5,412,792.00	35,578,806.49
1900.....	359,069	17.14	6,154,640.05	37,892,303.81
1901.....	402,574	17.14	6,902,311.00	39,581,216.55
1902.....	487,489	16.76	8,175,072.00	43,348,356.00
1903.....	512,659	13.36	6,850,877.00	44,669,233.16
1904.....	469,632	16.84	7,908,098.00	46,696,948.75
1905.....	524,768	14.14	7,420,885.50	48,826,940.55
1906.....	508,075	14.24	7,233,427.00	51,223,202.87
1907.....	513,657	13.96	7,175,645.00	64,419,177.98
1908.....	501,190	14.09	7,066,928.00	67,580,051.12

SHOWING THE NUMBER, AVERAGE VALUE PER HEAD AND TOTAL VALUATION OF HORSES ASSESSED FOR THE YEARS 1886 TO 1908, INCLUSIVE.

YEAR	NUMBER ASSESSED	AVERAGE VALUE PER HEAD	TOTAL VALUATION
1886.....	61,051	\$32.55	\$1,987,087.00
1887.....	66,658	34.96	2,310,702.00
1888.....	74,616	29.69	2,225,116.00
1889.....	81,639	29.24	2,387,269.00
1890.....	83,512	23.41	1,955,182.00
1891.....	84,007	25.84	2,170,472.00
1892.....	78,286	25.25	2,000,681.00
1893.....	76,223	25.83	1,969,541.00
1894.....	71,283	21.30	1,518,187.00
1895.....	73,518	21.04	1,547,299.83
1896.....	77,367	13.40	1,037,009.00
1897.....	79,284	13.09	1,138,027.00
1898.....	81,361	13.60	1,106,293.00
1899.....	82,746	16.14	1,336,490.00
1900.....	85,609	16.75	1,433,751.00
1901.....	91,822	15.63	1,435,512.00
1902.....	88,340	17.56	1,550,903.00
1903*.....	157,809	12.17	1,919,995.00
1904.....	86,205	23.04	1,986,085.00
1905.....	89,008	24.33	2,165,773.00
1906.....	79,571	27.94	2,223,569.00
1907.....	94,425	24.76	2,338,512.00
1908.....	99,755	26.45	2,639,423.00

*Uinta County abstract for 1903 reports 76,480 head of horses, which is undoubtedly an error. The correct number evidently should be 6,480. This would make the average value per head for the year 1903, \$21.87.

SHOWING THE NUMBER, AVERAGE VALUE PER HEAD AND TOTAL VALUA-
TION OF MULES AND ASSES ASSESSED FOR THE YEARS
1886 TO 1908, INCLUSIVE.

YEAR	NUMBER ASSESSED	AVERAGE VALUE PER HEAD	TOTAL VALUATION
1886.....	2,158	\$50.00	\$109,812.00
1887.....	2,643	52.33	138,310.00
1888.....	2,110	56.95	114,545.00
1889.....	2,038	54.36	110,700.00
1890.....	1,989	47.66	94,974.00
1891.....	1,887	50.80	95,869.00
1892.....	1,858	51.25	95,225.00
1893.....	1,640	41.76	78,500.00
1894.....	1,532	44.57	71,283.00
1895.....	1,407	41.93	68,996.00
1896.....	1,356	37.96	51,224.50
1897.....	1,212	42.18	51,124.00
1898.....	1,047	38.52	40,335.00
1899.....	892	36.87	32,891.00
1900.....	1,133	41.98	47,563.00
1901.....	1,108	36.23	40,142.00
1902.....	727	45.73	33,247.00
1903.....	901	33.87	30,517.00
1904.....	821	43.85	35,672.00
1905.....	891	48.37	43,100.50
1906.....	1,067	31.38	50,435.00
1907.....	1,037	47.13	48,880.00
1908.....	1,327	49.81	66,110.00

SHOWING THE NUMBER, AVERAGE VALUE PER HEAD AND TOTAL VALUA-
TION OF SHEEP ASSESSED FOR THE YEARS 1886 TO 1908, INCLUSIVE.

YEAR	NUMBER ASSESSED	AVERAGE VALUE PER HEAD	TOTAL VALUATION
1886.....	308,997	\$1.52	\$ 469,825.75
1887.....	421,788	1.51	637,438.50
1888.....	407,517	1.84	750,918.00
1889.....	459,991	1.73	794,557.00
1890.....	476,214	1.60	760,871.70
1891.....	550,368	1.69	931,762.00
1892.....	639,205	1.88	1,204,787.50
1893.....	785,453	1.97	1,550,438.75
1894.....	881,695	1.54	1,355,731.75
1895.....	1,172,810	1.50	1,762,606.00
1896.....	1,308,063	1.77	2,317,084.50
1897.....	1,391,795	1.80	2,506,286.00
1898.....	1,597,202	1.82	2,913,164.95
1899.....	2,164,701	2.02	4,380,681.65
1900.....	2,624,689	2.07	5,426,493.25
1901.....	2,848,711	2.01	5,737,219.50
1902.....	3,296,318	2.06	6,777,606.05
1903.....	2,796,226	1.90	5,322,075.05
1904.....	2,631,468	1.98	5,211,839.65
1905.....	2,658,450	2.10	5,583,587.85
1906.....	2,874,686	2.08	6,077,536.50
1907.....	3,369,663	2.61	8,702,167.50
1908.....	3,337,329	2.65	8,854,156.50

SHOWING THE NUMBER, AVERAGE VALUE PER HEAD, AND TOTAL VALUA-
TION OF SWINE ASSESSED FOR THE YEARS 1886 TO 1908, INCLUSIVE.

YEAR	NUMBER ASSESSED	AVERAGE VALUE PER HEAD	TOTAL VALUATION
1886.....	1,062	\$5.01	\$ 5,325.00
1887.....	1,186	5.01	6,010.00
1888.....	1,305	5.02	6,561.00
1889.....	2,583	5.00	12,919.00
1890.....	2,814	3.00	8,462.00
1891.....	1,852	3.43	6,357.00
1892.....	1,566	3.00	4,698.00
1893.....	2,047	3.01	6,175.00
1894.....	2,033	2.93	5,955.00
1895.....	3,359	2.99	10,035.00
1896.....	4,169	3.01	12,808.00
1897.....	4,812	3.97	19,095.00
1898.....	3,920	4.00	17,093.50
1899.....	3,192	4.31	13,754.00
1900.....	3,190	3.11	13,129.00
1901.....	3,386	3.98	13,373.50
1902.....	3,300	4.09	13,526.00
1903.....	3,931	4.79	18,833.50
1904.....	3,964	4.90	19,475.00
1905.....	6,306	5.00	31,543.00
1906.....	6,163	5.12	31,582.00
1907.....	7,389	4.99	36,800.00
1908.....	8,956	4.99	40,406.75

MINERALS

OUTPUT FOR THE YEAR 1908.

	VALUE
Coal.....5,426,329 tons	\$16,278,987.32
Copper.....	515,000.00
Building Stone, Asbestos and Onyx.....	110,000.00
Iron Ore.....950,000 tons	950,000.00
Gold.....	120,000.00
Silver.....	20,000.00
Petroleum.....	800,000.00
TOTAL.....	\$18,793,987.32

NOTES ON MINERAL RESOURCES.

The late Professor Wilbur C. Knight of the University of Wyoming identified 156 of the varieties of mineral noted in Dana’s System of Mineralogy as occurring in Wyoming and this list is constantly being added to as the different formations are opened up and understood.

There are few States in the Union that possess mineral resources as vast and varied as those of Wyoming. But there is not another State as rich in mineral wealth that the general public knows so little about, and where the resources are so universally ignored. Located, as it is, in the midst of the Rocky Mountains, and nearly surrounded by States with great mining interests, it is inexplicable why Wyoming has never produced a Leadville, Aspen, Deadwood or Butte. The mountains are as high and rugged; they are traversed by mineralized veins, and discoveries are numerous throughout the ranges. Camps have been located and prospectors have attempted,

at least, to make some mines. This prospecting, however, has never been thorough; the shafts are shallow and lateral development very slight. Unfortunately for Wyoming, the classes of men attempting mining have been those inexperienced in any kind of mining; at the outset they anticipated that a small expenditure this month meant large return the next. They have considered that a few hundred dollars would soon make a prospect worth many thousands. They have been disappointed time and time again. This class has not realized that it costs on the average \$35,000 to make a mine out of a prospect, to say nothing of mills to work the ore. This drawback, coupled with the work of dishonest manipulators, has been the stumbling block in the way of mining industries in Wyoming. It can be removed, and as soon as this has been done the mineral output will gradually increase until the State will compare favorably with its near neighbors. Making a mine is like building up a profession or business. It takes money and time and careful management, without which only failure awaits anyone searching for mineral wealth.

The fact that gold, silver, copper and lead ores are known in every mountain range is sufficient evidence that mines can be made here as in other localities. What Wyoming needs at this time more than anything else in connection with its mineral resources, is a few thorough mining men, who have ample means to make a mine out of some of the good prospects. As soon as it is proven that depth means a mine, then there will be no further trouble. There is not another State in the Rocky Mountains with greater possibilities than Wyoming; none with so much public domain subject to location as mineral land. Besides the precious metals, the wealth of coal, oil and gas will make Wyoming as great a State as Pennsylvania.

GOLD.

Gold mines were opened in Wyoming in 1867, since which date the industry has amounted to something each year. The production per annum has fluctuated from \$25,000 to \$125,000, the total amount produced being estimated at \$4,000,000. The placer mines that were rich enough to be worked with limited means were worked out years ago. Large tracts of placer gold ground, that can only be worked with great expenditure of money and the most modern and economic devices, remain. These are now owned by large companies, who are arranging to work some of them. The quartz veins, from which the most of the gold produced has been taken, and which will furnish most of the yellow metal in the future, are found in all of the mountains. Districts that have been prominent are as follows: Fremont County; Seminoe, Gold Hill and Sierra Madre Mountains in Carbon County; Jelm, Medicine Bow and Centennial in Albany County; Black Hills, Shoshone Mountains and Laramie Mountains. As a rule, a vein with good ore near the surface is a favorable prospect. These are common in Wyoming, and should the shafts be carried to sufficient depth the veins will prove valuable.

SILVER AND LEAD.

There are silver and lead prospects in nearly all of the mountain ranges. Galena is the leading ore, and it always has silver associated. The silver

value varies from ten to six hundred ounces per ton. All of these prospects are located a long distance from the railroad. Camps have been located in Crook, Big Horn, Carbon, Albany and Laramie Counties. While Wyoming may have as good lead and silver camps as any other State, it is a hard matter to interest capital in propositions ranging from fifty to two hundred miles from the railroad.

COPPER.

During the past few years copper in commercial quantities has been found in nearly all of the thirteen counties of the State, and development work is being actively pushed. The principal ore is usually a chalcopryrite, or yellow sulphide of copper, associated with the rarer forms. These forms are usually covered by a capping of oxidized iron, in which the oxidized forms of copper, usually the blue and green carbonates, are found. The Grand Encampment Copper District, in southern Wyoming, is the leading producer.

The district popularly known as the "Grand Encampment" country lies in the southern part of Carbon County and the southwestern corner of Albany County, south of the main line of the Union Pacific Railroad.

Mining has been carried on in this region from the earliest known period of the State's settlement, but the first permanent work was in 1872 in the Kurtz-Chatterton property on Copper Creek, west of where Encampment now stands. It was not until 1897-8 that the district became prominent by reason of some rich gold ores found in Purgatory Gulch, a small tributary of the South Fork of the Grand Encampment River, and the town of Grand Encampment was started.

The discovery of the Ferris-Haggerty copper mine on the North Fork of Battle Creek followed in the winter of 1898, and attention was then turned to copper, with the result that the region is being thoroughly exploited and is becoming a permanent copper producer.

The district is somewhat irregular in shape. The tract embraced in the known mineralized country extends along the Wyoming-Colorado line, easterly and westerly, for a distance of about eighty miles, and northerly and southerly for a distance of from fifteen miles at Encampment to forty miles at Elk Mountain, near Saratoga, comprising about 2,000 square miles of mountain and valley.

The town of Grand Encampment is the terminus of the Saratoga & Encampment Railroad and the practical center of the mining activity of this region. It is pleasantly situated, substantially built and has about 1,000 population at the present time. Here are the principal supply houses, bank and headquarters of the principal companies operating in this district; the eastern terminus of the aerial gravity tramway from the Ferris-Haggerty mine to the Encampment reduction works, the Encampment Power & Light Company's works and the other enterprises owned by the Penn-Wyoming Copper Company

The Aerial Tramway is sixteen miles in length, divided into four sections, with three auxiliary power stations, one at the mine, one at Upper Cow Creek at the foot of Bridger Peak, and one at Lower Cow Creek. These stations are equipped with power plants, storage bins, etc. to facilitate the operations of the line. Three hundred and four towers, with tension stations at intervals, are used to support the cables, which, moving at an average speed of four miles an hour, with buckets holding 700 pounds of ore each, are capable of delivering 984 tons of ore per day.

In March, 1906, the old concentrator was destroyed by fire and the present mill erected in its place on a larger scale and greatly improved in every way. The mill is built in two sections, so that only half the works need be idle for repairs at one time; and the whole scheme of working is automatic as far as possible, gravity being utilized to aid the separation wherever a fall can be obtained.

The ore from the receiving bins passes through a huge Blake crusher to an elevator, thence to revolving screens, the oversize passing to roughing rolls and to a conveyer which carries the entire mass to the storage bins. From these bins the ore goes to two immense Hancock jigs, capacity 700 tons each per day, for coarse and fine material, the coarse, oversized ore passing through two pairs of grinding rolls, thence to twelve No. 5 Wilfley tables for further concentration. A portion goes to regrinding rolls and the fine material, or slimes, goes on through the slime department for final treatment.

The smelting end of the works has been entirely rebuilt since the fire of March, 1906, and is now producing blister copper as usual.

The completion of the Saratoga & Encampment Railroad to Encampment has completely changed the situation here relating to mining and the allied industries and the production of copper at a commercial rate is now a certainty for this district in the future.

The total copper production of Wyoming from the earliest record to December 31, 1907, is as follows, the prices given being the average price of copper for the year:

YEAR	NUMBER OF POUNDS	PRICE PER POUND	VALUE
1882.....	7,500	17.100 cents	\$ 12,757.50
1883.....	962,468	13.700 cents	131,858.11
1888.....	232,819	15.900 cents	36,017.32
1889.....	100,000	12.000 cents	12,000.00
1895.....	6,872	11.101 cents	694.07
1897.....	127,471	10.110 cents	14,149.28
1898.....	233,044	12.000 cents	27,965.28
1899.....	3,104,827	17.100 cents	530,925.39
1900.....	4,206,776	16.250 cents	683,601.50
1901.....	914,412	16.110 cents	140,909.82
1902.....	75,297	11.620 cents	8,749.51
1903.....	947,106	13.420 cents	127,101.62
1904.....	4,220,000	12.831 cents	541,046.20
1905.....	2,420,629	15.590 cents	55,376.16
1906.....	50,000	19.278 cents	9,639.00
1907.....	2,350,000	20.098 cents	472,303.00
TOTALS.....	20,046,721		\$13,105,093.66

Copper properties are increasing as the prospecting advances. The Grand Encampment district has undergone a complete change, which has consolidated the smelting plant, the tramway and the Ferris-Haggerty and other valuable properties. The New Rambler mine has also changed hands, and the new company is pushing development. At Pearl, which is near the Wyoming line, great interest is manifested in the recent strikes in the copper prospects. In other mountain ranges in the State copper prospects are being developed.

COAL.

Wyoming has more coal lands than any State in the Union, and these are underlaid with from one to ten workable veins, varying from four to twelve feet in thickness as a rule. Uinta County, however, has one vein of coal that is eighty-six feet in thickness, which is, so far as known, the thickest seam of coal in the world. It is only proper to add that this is a superior lignite, and that the vein is practically free from all kinds of impurities.

The varieties of coal found in this State are as follows: Semi-anthracite (not workable), bituminous, both coking and non-coking, and lignites. The bituminous coals and lignites shade imperceptibly into each other, so it is almost impossible to separate them. As a whole, they are excellent fuels, and have won for the State an enviable reputation from Omaha to San Francisco. The only coking coal that is being worked in the State is at Cambria, where 25,000 or 30,000 tons of coke are manufactured annually.

The development of the coal fields commenced with the coming of the Union Pacific Railroad, and already the industry brings into the State upward of \$6,000,000 annually. Coal mines on a large scale are operated at Superior, Cumberland, Diamondville, Frontier, Rock Springs, Glenrock, Cambria, Dietz and Aladdin.

The coal fields are so universal that commercial coal is known to exist in every county, and in all but one coal mines are worked. The area of workable coal land is over 20,000 square miles. The coal veins are numerous. It is not an uncommon thing to find six or eight workable veins in a single field. In thickness the seams vary from a few inches to seventy-five feet. The coal mines operated at present have working veins varying from four to forty feet. The coal lands are owned, to a large extent, by the Government, and are subject to location. Already three great railroads have penetrated these fields, but the industry has only started, and by the close of another quarter of a century Wyoming will be producing not less than 10,000,000 tons of coal per annum.

Wyoming stands twelfth in the list of coal-producing States, and while the amount produced in other States has remained stationary in the past two years, the amount produced in Wyoming has increased 20 per cent.

The following table shows the output of the Union Pacific Coal Company's mines in 1908 in tons:

MINE	LUMP	R. OF M.	EGG	NUT	SLACK	TOTAL
Rock Springs No. 1.....	105,875	438	19,339	31,662	101,698	259,012
Rock Springs No. 7.....		195,218				195,218
Rock Springs No. 8.....	17,444	269,021				286,465
Rock Springs No. 9.....	46,068	176,340	1,121	1,941	11,513	236,983
Rock Springs No. 10.....	65,511	158,009		12,554	34,232	270,306
Total Rock Springs.....	234,898	799,026	20,460	46,157	147,443	1,247,984
Hanna.....	54,764	433,286	3,574	6,687	40,218	538,529
Cumberland.....	775	597,480			24,383	622,638
Grand Total.....	290,437	1,829,792	24,034	52,844	212,044	2,409,151

The analyses given below are fair averages:

CUMBERLAND.		ROCK SPRINGS.	
Moisture.....	3.97	Moisture.....	4.80
Volatile Matter.....	41.30	Volatile Matter.....	44.07
Fixed Carbon.....	49.54	Fixed Carbon.....	49.53
Ash.....	5.19	Ash.....	1.60

Following is a table of general information relating to the Wyoming coal:

LOCATION			ANALYSES					KIND OF COAL
FIELD	COUNTY	CITY	WATER	VOLAT. MATTER	FIXED CARBON	ASH	FUEL	
Rock Springs	Sweetwater	Rock Springs.	5.38	36.42	55.60	2.60	92.02	Bituminous
"	"	Hopkins.....	5.55	36.95	55.70	1.80	92.65	"
"	"	Black Butte..	14.23	31.00	49.85	4.92	80.85	Lignite
Evanston....	Uinta.....	Almy.....	7.37	34.88	48.75	9.00	83.66	Semi-Bituminous
"	"	Red Cañon...	7.42	36.08	48.50	8.00	84.58	"
Rawlins.....	Carbon.....	Rawlins.....	6.55	32.85	54.00	6.60	86.85	Bituminous
Kindt.....	"	"	4.87	35.68	55.15	4.30	90.83	"
Hanna.....	"	Hanna.....	8.72	44.37	38.70	8.21	83.07	Semi-Bituminous
Carbon.....	"	Carbon.....	7.42	35.43	48.30	8.85	83.73	"
Glenrock....	Converse...	Glenrock....	13.82	33.03	47.75	5.40	80.78	Lignite
Cambria.....	Weston....	Cambria.....	5.72	40.13	43.65	10.50	83.78	Bituminous Coking
Buffalo.....	Johnson...	Buffalo.....	13.55	35.05	45.30	6.10	80.35	Lignite
Sheridan....	Sheridan...	Higby.....	13.05	37.55	44.70	4.70	82.25	"
Brier Hill...	Crook.....	"	5.25	41.70	44.98	8.07	86.68	Bituminous
Dutton.....	Albany.....	"	11.85	34.65	47.30	6.20	81.85	Semi-Bituminous
Twin Creek..	Uinta.....	Kemmerer...	3.53	43.58	51.36	1.53	94.94	Bituminous
Gros Ventre.	"	"	8.50	41.15	46.95	3.40	88.10	"
Seminole....	Carbon.....	"	11.01	33.27	48.48	6.24	81.75	Semi-Bituminous
"	Big Horn..	Thermopolis.	9.75	33.25	50.30	7.00	83.55	Lignite
Lander.....	Fremont...	"	11.40	36.60	47.60	4.40	84.20	"
Casper.....	Natrona...	"	11.30	32.10	53.55	3.20	85.65	"

The coal fields of Wyoming estimated by the county have the following areas:

COUNTY	COAL AREA IN SQUARE MILES
Sweetwater.....	3,313
Carbon.....	2,421
Crook.....	2,360
Fremont.....	2,242
Uinta.....	2,000
Big Horn.....	1,820
Converse.....	1,612
Sheridan.....	1,524
Weston.....	1,207
Johnson.....	1,320
Natrona.....	1,247
Albany.....	400
Laramie.....	Non-productive
Total.....	21,464

This estimate deals only with fields of economic importance. When a coal survey has been completed it will be found that this estimate is by far too low, and that the entire coal-producing area will approximate 30,-000 square miles.

Following is a statement showing the coal production in Wyoming from the starting of the industry:

YEAR	SHORT TONS	YEAR	SHORT TONS	VALUE
1868	6,925	1885	807,328	\$2,421,984
1869	49,382	1886	829,355	2,488,065
1870	105,295	1887	1,170,318	3,510,954
1871	147,328	1888	1,481,540	4,444,620
1872	221,745	1889	1,388,276	1,748,617
1873	259,700	1890	1,870,366	3,183,669
1874	219,061	1891	2,327,841	3,555,275
1875	300,808	1892	2,503,839	3 168,776
1876	334,550	1893	2,439,311	3,290,904
1877	342,853	1894	2,417,463	3,170,392
1878	333,200	1895	2,246,911	2,977,901
1879	400,991	1896	2,229,624	2,904,185
1880	527,811	1897	2,597,886	3,136,694
1881	628,181	1898	2,863,812	3,664,190
1882	707,764	1899	3,837,392	4,742,525
1883	779,689	1900	4,014,602	5,457,953
		1901	4,485,374	6,060,462
		1902	5,000,000	*6,250,000
		1908	5,426,329	16,278,987

*Estimated

The following table showing the taxation of the output of mines for the year 1908, is from the report of the State Auditor:

COMPANY	GROSS TONS	ASSESSED VALUE PER TON	TOTAL ASSESSED VALUATION
Union Pacific Coal Company—			
Hanna mine	581,402.00	\$0.46	\$ 267,444.92
Cumberland Mine.....	771,389.55	0.46	354,839.19
Rock Springs	1,482,591.00	0.63	934,032.33
Owl Creek Coal Company.....	14,600.97	0.44	6,424.43
Cole Creek Coal Company.....	19,914.00	0.33	6,571.62
Glenrock Coal Company.....	29,550.00	0.33	9,751.50
Stillwell Coal Company.....	3,938.00	0.34	1,338.92
Hudson Coal Company.....	8,406.30	0.44	3,698.77
Carney Coal Company.....	285,810.00	0.44	125,756.40
Sheridan Coal Company.....	594,131.55	0.44	261,417.88
Wyoming Coal Company	320,688.00	0.44	141,102.72
Wyoming Coal Company.....	23,599.80	0.46	10,855.91
Black Diamond Coal Company.....	2,000.00	0.44	880.00
Nelson Brothers.....	2,000.00	0.44	880.00
Central Coal & Coke Company.....	359,988.00	0.63	226,792.44
Superior Coal Company.....	220,617.00	0.63	138,988.71
Kemmerer Coal Company.....	452,984.20	0.46	208,372.73
Diamond Coal & Coke Company.....	595,868.95	0.46	274,099.72
Rocky Mountain Coal & Iron Company.....	67,256.00	0.46	30,937.76
Evanston Coal Company.....	2,045.00	0.46	940.70
Cambria Fuel Company.....	361,015.00	0.34	122,745.10
Western Alkali Company.....	1,350.00		5,000.00
Penn-Wyoming Copper Company.....	2,250,000 lbs		100,000.00
Colorado Fuel & Iron Company.....	625,910.88	0.22	137,700.40
TOTAL ASSESSED VALUATION.....			\$3,370,572.15

PETROLEUM.

When it comes to oil, Wyoming certainly bids fair to illuminate and lubricate the works of man for generations. The eighteen oil fields known in this State present a greater variety of product than any similar known area, as it varies from the highest grade of lubricating oils without a trace of illuminating constituents to an equally high grade of illuminating oil totally free from lubricants, and with a range of intermediate oils and products that is a revelation to oil men.

In each of the eighteen oil fields, oil is flowing from springs, or there are thick bands of oil sand exposed. The greater number of these fields are situated in the central part of the State, but there are fields in the northeastern portion, in the southwestern part, and in the northern central region. The oils that have been analyzed vary in nature from high grade lubricating to oils that will produce from 40 to 50 per cent of kerosene.

With proper facilities for transportation, the oil industry in Wyoming will equal, if not surpass, that of any other state.

The greatest development is found in Natrona County, where a lubricating oil is found which has been pronounced by experts to be the best in the world; and in Fremont County, where there are thirteen flowing wells, now capped for the want of a railroad. At Casper there is a refinery having a capacity of 200 barrels of crude oil per day.

Captain Bonneville was the first of the pioneer travelers in the Rocky Mountains to report the discovery of petroleum oil. About the spring which he visited in 1832, on the Little Popo Agie River, near Lander, there are now thirteen flowing wells, with a capacity each of 200 barrels per twenty-four hours. Later discoveries of oil were made by the pioneers that went to Oregon, Utah and California, and still later by the cowboys and prospectors, and yet there are many thousands of square miles of inviting territory that has not been prospected and many places where there are as good indications of oil as have been found in other localities. These remain for the prospectors of the future.

The utilization of Wyoming oil commenced in the days of the early trappers, when they depended upon it for liniment for man and beast. Later the overland traffic used it to grease wagons, and there were men who made a business of skimming the oil from the springs for this purpose. When the Union Pacific Railroad was completed, some attempted to develop the fields near Hilliard. A tunnel was driven into the oil sandstone, and from this opening and the pits that had been dug, oil was collected and sold at the coal mines for several years; but finally it was supplanted by the eastern crude. As soon as mining was placed upon a substantial basis in the Black hills, prospectors commenced to collect the oil from the oil springs along the Belle Fourche river and haul it by wagon to Deadwood. A well or so was drilled, and from one of these shallow drills a company pumped five barrels of oil per day and marketed it at Deadwood for \$28 per barrel. This industry con-

tinued until the North Western railroad reached the mining region and furnished oil at a lower figure. The greatest advancement made in early days in the development of our oil resources was led by the late Dr. Graff of Omaha. He organized a company which drilled in the Popo Agie oil field in 1883 and before he suspended operations he had three flowing oil wells which produced 200 barrels each per day. Owing to the lack of cheap transportation and the long distance from the completed railroads, these wells were packed and the oil never utilized except to supply local demand.

The success of this company in striking oil induced many others to enter into the various fields, and within a year or so rigs were erected, in Beaver, Rattlesnake, Arago, Oil Mountain, Powder River, Belle Fourche and in the neighborhood of the Popo Agie. But unfortunately not one of these companies was successful in finding a paying well. This was at the dawning of development. Although many were discouraged, and some were much embittered toward the oil industry of the State, the Pennsylvania Oil Company entered the territory in 1889 and before the year closed they had a producing well at Salt Creek. They drilled several others and in 1894 commenced regular shipments and have been constant producers ever since. Their experience induced a few other companies to organize and commence work; but for some reason they were not successful. Several years ago an English company entered the State and made some examinations, which led up to the sale of the Popo Agie wells. About this time the oil fever had commenced to subside in California and the oil world was thrown into great excitement over the Beaumont discovery. People began to note the merits of the Wyoming fields. This excitement was augmented by the discovery of oil at Spring Valley in a well being drilled for water for the Union Pacific railroad.

There are eighteen known oil fields in this State where either oil sandstone or oil springs are found; indeed, the recent discovery southwest of Rawlins makes the whole number nineteen, and many more are to be added to the list. Eventually we may expect to have not less than two dozen independent oil districts.

The oil fields are distributed as follows: The Carter, Hilliard, Spring Valley and Twin Creek are located in Uinta County; Popo Agie, Lander, Shoshone, Beaver and a part of Dutton in Fremont County; Rattlesnake, Arago, Oil Mountain and a part of Dutton, Powder River and Salt Creek in Natrona County; part of Powder River and Salt Creek in Johnson County; Newcastle in Weston County; Belle Fourche in Crook County; Douglas in Converse County; Bonanza in Big Horn, and the new field in Carbon County. In other words, oil fields are known in every county in the State, with the exceptions of Sweetwater, Sheridan, Albany and Laramie.

All of the petroleum known in Wyoming is associated with anticlinal folds, or with natural domes. The oil men will do well to consider this statement and let it govern them in drilling wells and locating oil lands.

The geological range of petroleum in Wyoming is shown in the following table:

				Maximum Thickness						
CENOZOIC....	{	Tertiary.....	{	Base of Eocene.....	{	Secondary Oil Dutton Field.....	1,000 ft.			
				Laramie.....	{	Rattlesnake Hilliard Fossil.....	5,000 ft.			
					Fox Hills.....	{	Spring Valley? Rattlesnake Carter Salt Creek?.....	6,000 ft.		
						{	Douglas? Carbon?			
				Fort Pierre.....		{	Salt Creek?			
						Cretaceous.....	{	.....	7,000 ft.
					Niobrara.....		{	Rattlesnake? Dutton.....	2,000 ft.	
				Fort Benton.....			{	Dutton Lander.....	2,000 ft.	
					MESOZOIC....	{	{	Dakota.....	{	Newcastle Powder River Oil Mountain? Arago Rattlesnake Dutton Beaver Bonanza Belle Fourche.....	1,000 ft.
				Jurassic.....					{	Como.....	{	Powder River
{	Shirley.....	{	Powder River.....						500 ft.	
Triassic.....	{		{	Oil Springs Popo Agie Shoshone						
				PALEOZOIC....					{	Permian.....	{	Popo Agie Shoshone
Carboniferous.....	{		{									Probably in others..	1,500 ft.
				Vertical range.....					26,000 ft.	

Following is a table of general information of the Wyoming oil fields and crude oil:

FIELD	COUNTY	SPECIFIC GRAVITY OF CRUDE	FLASHING POINT OF CRUDE	COLOR OF OIL	GEOLOGICAL HORIZON	NATURAL OCCURRENCE	NO. OF PRODUCING WELLS	PRODUC'N BARRELS TO WELL	REMARKS
Salt Creek...	Natrona.	.9100	221°F	Green	Fox Hills or Fort Pierre	Oil springs	10?	5	Constant production
Powder River	Johnson.	.9160	224°F	Green	Dakota	Oil sandstone			Oil pits, producing
Oil Mountain	Natrona.	.9100	234°F	Green	Como Shirley	Oil sandstone			
Rattlesnake..	Natrona.	.9000		Green	Fort Benton*	Oil spring			
		.995	?	Black	Dakota	Oil springs			
		.9550		Black	Niobrara	Oil sandstone			
Arago.....	Natrona.	.9950	?	Black	Fox Hills				
		.9950		Black	Dakota	Oil springs			
Dutton.....	Natrona.	.9220	?	?	Eocene, Ft. Benton	Oil sand			Oil distilled from sand
Beaver.....	Fremont.	.9650	280°F	Brown	Niobrara, Dakota				
Popo Agie...	Fremont.	.9210	168°F	Black	Dakota	Oil springs	5	500	Wells packed
Lander.....	Fremont	.8565	117°F	Green	Permian or Carboniferous	Oil springs			
Shoshone....	Fremont.	.9210	168°F	Black	Fort Benton*	Oil springs			
Bonanza....	Big Horn	.8544	133°F	Green	Permian or Carboniferous	Oil springs			
Belle Fourche	Crook...	.9150	123°c	Black	Fort Benton*	Oil sandstone	3	?	Oil pits
New Castle..	Weston..	.9200	259°F	Green	Dakota	Oil springs	1	?	Cased wells
Douglas.....	Converse	.9210	?	Brown	Fort Benton*	Oil springs			
Hilliard	Uinta ...	?	?	Brown	Dakota	Oil sand			
Carter	Uinta ...	.9240	311°F	Brown	Laramie	Oil springs	1	?	
Spring Valley	Uinta ...	.8150		Green	Laramie?	Oil springs			
Twin Creek..	Uinta ...	.935	237°F	Brown	Laramie	Oil well			
Carbon.....	Carbon..				Fox Hills?	Oil springs			
						Oil sand			

*Springs in Fort Benton; source of oil probably Dakota.

NATURAL GAS.

Accompanying the oil fields are numerous natural gas horizons. The gas pressure in the oil wells near Lander is very great, and gas escapes are found at or near most of the oil springs. In the eastern part of Fremont County there are two natural gas escapes that are wonders. Some prospectors have dug shallow shafts and curbed them up with logs; the shafts are partially filled with water, and the gas escapes with such violence as to cause the water in them to boil as though in a cauldron. There are numerous anticlinals in the State that are not associated with the oil districts, where large flows of gas may be looked for.

BITUMINOUS SHALE.

In the Green River Valley there are great bands of rich bituminous shale that equal the shales of Scotland, where an army of men is employed. and the production is sold for millions of dollars per annum. The shales are burned in a retort, and the products saved are gas, oil, tar and ammonium sulphate. This industry will, at no distant date, prove to be a valuable one to the State.

ARSENIC.

Ores of arsenic are found associated with ores of gold and silver, and in several localities there are extensive bodies of mispickel.

VOLCANIC ASH.

In several localities in Wyoming volcanic ash has been found. In Albany County, near Laramie, there is a bed four feet in depth. It is almost white, and is so fine that the greater portion of it will pass through a 100-mesh sieve. Samples of equal purity have been examined from Carbon and Sweet-water Counties. This mineral is used for scouring purposes. It is the base of Sapolio, and is also used in the Geyserite soap.

GRAPHITE.

Veins of graphite are known at Plumbago Cañon, French Creek and Halleck Cañon in Albany County, and in the Indian Grove Mountains in Carbon County. The veins are large and easily accessible. Analysis of samples from the various localities shows the carbon contents to vary from 40 to 60 per cent. So far as known, the ore is of the amorphous variety, and would make good fire-proof paint, stove polish or graphite crucibles.

ASPHALTUM.

Along the north side of the Rattlesnake Mountains there are several deposits of asphaltum that occur below the oil springs. There are also places where the asphaltum has penetrated loose rock and earth. The beds are not extensive, but are sufficiently large to pay for opening. There is also another bed on the Shoshone Reservation east of Fort Washakie. This has been formed about an oil spring and contains several thousand tons. No attempt has been made to work the deposits. The quality is excellent, quite free from foreign matter, and it would make a splendid paying mineral.

MANGANESE ORES.

Ores that fall under this class have been found in Albany, Crook and Uinta counties. The development is only slight, since the discoveries are too far from railroads to warrant shipments. The ores are of good grade, and are found in good-sized veins. Samples from different localities vary from 40 to 55 per cent of manganese.

EPSOM SALTS.

Epsom salt can be found in small quantities throughout the arid region, but in Wyoming it is found in large beds. Near Rock Creek there is a depression containing about ninety acres that is covered with this salt. The exact depth is not known. In this immediate vicinity there are several other beds. The salt is as pure as the commercial product that sells in the drug stores for ten cents per ounce. These deposits are near the railroad, and, if properly handled, should enable a company to control the Epsom salt trade of America.

BUILDING STONE.

Building stones of innumerable varieties are common throughout the State. The stone industry, however, has never been of much more than local importance, and only a few quarries have been opened with a view to export trade. Granite, sandstone, limestone, quartzite, serpentine marble and marble onyx are included in the varieties. The majority of these are found in inexhaustible beds and are not surpassed for beauty and durability. There is no reason why the stone industry of Wyoming should not compare favorably with that of Colorado.

GYPSUM.

This mineral is common and is found in all varieties. Beds varying from 20 to 100 feet in thickness are exposed along the mountain ranges. The mineral is very pure and can be utilized for purposes where gypsum is required.

PLASTER OF PARIS.

The Consolidated Plaster Company is operating a plaster mill at Red Buttes, which is the only one in the State. There is room and material in sight to supply a thousand mills; in fact, Wyoming could furnish the world with plaster of paris for a thousand years, and then not consider the beds exhausted.

NATURAL PLASTER.

In a few localities deposits of what has been called a natural plaster have been found. The mineral occurs in superficial deposits, varying from two to six feet in depth. It is pulverulent and has a light gray color. When a portion of the water has been driven off, it sets and makes a hard cement. The Standard Plaster Company of Laramie is manufacturing a plaster from beds recently opened near Laramie, and no doubt in numerous other localities beds of this natural plaster will be found, when prospected for.

CLAYS.

At a few places in the State, pressed and common brick are manufactured but there are no other clay industries. The clay beds are in abundance and are found in every county in the State. Common brick clay, fire clay, tile and terra cotta clay and potters' clay are found in thick beds in the sedimentary rocks, and not in superficial deposits, as they are usually seen in the Northern and Eastern States. The clay has not been studied, and one can not at this time predict the future of the clay industries. Only a few years ago a clay was discovered at Rock Creek that was called mineral soap. For a number of years this clay has been sold in car loads to Eastern clay men. The industry is on the increase each year, and it seems reasonable that it will ere long be of considerable importance.

TIN.

Black oxide of tin has been known in veins and as stream tin in the Wyoming portion of the Black Hills for many years. Tons of stream tin have been mined and sold. The veins are slightly developed. Prior to the failure of the Dakota tin mining companies the prospects on the west side of the hills were considered quite valuable. There are good veins of tin of average richness, and before many years the tin mines of Dakota and Wyoming will be worked.

SALT.

Salt springs, rich enough to warrant the establishment of a salt plant, occur in Weston, Johnson and Uinta Counties. Salt has been manufactured in Uinta and Weston Counties, but for local consumption only.

QUARTZ.

The Laramie Mountains abound in large veins of pure quartz. When ground it is valuable for glass making.

GLASS SAND.

There are numerous places in the State where glass sand is found. The beds near Laramie have been worked and proven.

MICA.

Muscovite mica, the mica of commerce, is plentiful in Wyoming, but there are only a few localities where it has been found in "book" of sufficient size to warrant mining. In Whalen Cañon, some eight or ten miles from Hartville, and at Grand Encampment, there are numerous large veins of feldspar containing first-class mica. The former has been worked to some extent and a small shipment made. Sheets squaring six inches have been taken out near the surface. It is first quality in every respect.

FELDSPAR.

Orthoclase feldspar occurs in large veins in Whalen Cañon. It is free from detrimental minerals, and could be utilized for all purposes where orthoclase could be used.

SULPHUR.

Extensive deposits of native sulphur are known in Uinta County. While claims are held by prospectors, no attempt has been made to refine the crude brimstone, which assays from 40 to 70 per cent of sulphur.

BISMUTH.

Bismuth ore of rare purity has been mined at Jelm Mountain and shipped to the East for reduction. The ore is a mixture of carbonates and metallic bismuth, and assays from 50 to 65 per cent of metal.

SULPHATE OF ALUMINUM.

This mineral, which is usually called native alum, occurs in extensive deposits in Sweetwater and Big Horn Counties. It is the principal salt used in manufacturing commercial alums, and for this purpose it should be utilized in connection with the natural soda.

IRON.

Second to those of no State in the Union are the deposits of iron ore. Prospecting along this line has not been carried on to any extent, and only iron districts reasonably near the railroads have received any attention. The greatest deposits are red hematites, free from sulphur and phosphorus, and low in silica. The only districts where development or mining has been carried on are Hartville, Rawlins and Seminoe. In these camps are large deposits of soft ore which makes an excellent pigment. The hard ores are found beneath the surface in bodies varying from 10 to 100 feet in thickness. Rawlins and Hartville have furnished thousands of tons of ore to be used by the Salt Lake and Denver smelters as a flux for lead and copper smelting, and two railroads have been built to the Hartville mines. Besides the hematites, there are great deposits of marquetites in the Laramie Mountains, and beds of clay ironstone in the cretaceous rocks. Hematite ore has been found in Crook, Uinta, Johnson, Fremont, Big Horn, Albany and Sheridan Counties. The ores examined are of exceptional purity.

Among the noted camps in the State is Hartville, where the Colorado Fuel & Iron Company has made extensive investigations and has opened up enormous bodies of a high grade bessemer ore. From the present indications the ore is equal to anything that has been discovered, in purity, quantity and accessibility. The development has uncovered sufficient ore to keep the company at work for many years. The mining capacity of this plant is 1,500 tons per day. The ore is blasted from a great open cut and loaded by steam shovels at a small figure. At the present time it is hauled by rail to the Pueblo plant where it is manufactured into steel. The Hartville camp is extensive, and there are no less than a thousand claims either patented or being held by the regulation assessment work. The ore is a hematite, resembling the ores of the Superior region. It occurs in a similar geological formation and the veins vary from 50 to 200 feet in width.

At Rawlins there is a large deposit of hematite ore that has been known for years, and from time to time it has been mined and shipped to Salt Lake and Denver for a flux in the gold and silver smelters. The extent of this ore

has not been proven. It is a blanket vein apparently between limestone and quartzite, varying from two to twenty feet in thickness. By the carload it averages above 60 per cent metallic iron, and as far as analyses have proven it is an excellent bessemer ore.

In the Seminoe Mountains, some thirty miles northeast of Rawlins, there are some extensive iron deposits that have attracted considerable attention, but being far from the railroad, no one has developed them in a way to prove their value. The ore is largely an iron schist with bands of hematite. A large block of this land was patented many years ago and is now held for a high figure. The hematite ore is rich and often assays from 60 to 65 per cent of metallic iron.

While the above are the most important iron districts at the present time, there are many others that would look equally well if they could be developed. One of the most common ores of the State is the macaceous hematite of the Laramie range, which occurs in large bodies and is of exceptional purity. So far in the history of the State no one has paid any attention to this desirable variety.

Wyoming will eventually be the great iron State of the Rocky Mountain region. Reliable engineers have already placed the time limit upon the Superior mines, and it is now reported that it will only take thirty years to exhaust this great iron field. As the Eastern States are worked out, Wyoming will take their place, and eventually furnish a large amount of the iron needed in the United States.

An analysis of the various iron ores found in Wyoming shows the following results:

	IRON	SILICA	PHOS- PHORUS	SULPHUR
Hartville, 1.....	66.09	2.40	0.007	None
Hartville, 2.....	62.35	9.12	Trace	None
Hartville, 3.....	61.92	*	0.02	None
Seminoe, 1.....	63.56	2.68	0.03	*
Seminoe, 2.....	68.60	4.30	Trace	Trace
Seminoe, 3.....	61.35	*	*	0.005
Rawlins, 1.....	63.14	6.41	0.041	Trace
Rawlins, 2.....	64.12	5.82	0.037	0.007

*No estimates.

FIBROUS TALC.

A large vein of fibrous talc exists in the range of mountains west of Wheatland. The quality is excellent. This mineral is used extensively in the East, and as soon as the proper transportation can be furnished, the Wyoming deposits will be worked.

DECOMPOSED GRANITE.

Some ten years ago the Union Pacific Railroad Company commenced loading decomposed granite from a point near Sherman and hauling it out as ballast. It was found to be far superior to any other stone for this purpose. In one year the company loaded 304,936 tons, the most of which was used for railroad purposes; but it was also, to some extent, sold for road-

building in cities, a use to which it is well adapted. Since that year almost the entire Union Pacific system has been reballasted with this now famous gravel, rendering the roadbed of this great overland route practically dustless.

NATURAL PIGMENTS.

Soft iron ores have been utilized for red paint for years. For many years paint mills were operated at Rawlins. More recently the ore has been shipped to other States to be ground. The soft hematite ores are in large bodies and make a first-class paint. Ochres of various shades are known, but the beds have not been worked. Graphite that would make an excellent fireproof paint is found in large bodies, but so far it has not been utilized.

SEMI-PRECIOUS STONES.

The semi-precious stones are in abundance. Quartz crystals, agates, jaspers, moss agates, petrified wood, garnets, and beryls are the more important. The moss agates are the best found in the world. Thus far no precious stones have been reported.

NATURAL SODA.

Extensive deposits of natural soda are known in Carbon, Natrona and Albany Counties. Numerous springs contain considerable soda, and at Green River a well yields a saturated solution of sodium carbonate. The deposits vary in size from a few to 100 acres, and the soda ranges in thickness from a few inches to sixteen feet and possibly more. These deposits are chiefly sodium sulphate, but there are carbonates and possibly some bi-carbonates in some localities; along the Sweetwater River there are deposits that contain 60 per cent of carbonate. Attempts have been made to work these great deposits of soda, but so far, owing to lack of transportation facilities, they have not been successful. The sulphate, when dried and calcined has been sold in the East for glass-making, and also used at the Laramie glass factory. With proper machinery these great beds of soda can be utilized and would bring in a large revenue.

ASBESTOS.

There are two minerals called asbestos, one a serpentine and the other an amphibole. The latter is the true asbestos, but the former is sold under the same name and used in the same way. The asbestos that is found in Wyoming, with the exception of small mineralogical specimens, belongs to the serpentine variety, and is known as chrysolite. Valuable deposits of this mineral have been found in Natrona, Albany, and Carbon Counties. Natrona County has marketed some of the mineral.

The name "asbestos" is derived from the Greek and signifies "incombustible" or "inconsumable."

That asbestos in a crude form was utilized scientifically as far back as 2000 B. C. is proven by the fact that ancient Egyptian writings tell of a fine hand-woven asbestos cloth which was used in the preservation of

the Egyptian dead. Several of the Greek and Roman historians characterize these cloths as "Incombustible Blankets," and Pausanias states that the wick of the great lamp in the temple of the palace of Athene was made of "crystallic flax," a name which is nothing more or less than the technical term for asbestos.

History also recites that Charlemagne entertained and awed his guests by removing the table cloth after a feast and throwing it into the fire, from which he extracted it unburnt and uninjured, the table cloth being described as being made of "cotton stone."

Interest in asbestos in the United States centers chiefly in the Casper Mountain district of Wyoming where deposits are known to exist which probably constitute the largest thus far known to the scientific world.

This district has been extensively explored and examined by the foremost geologists and engineers of Wyoming and other states and their reports, without exception, indicate the mineral to be of the same grade as the Canadian deposits, but greatly in excess in point of quantity.

A CATALOGUE OF WYOMING MINERALS.

BY DR. W. C. KNIGHT, UNIVERSITY OF WYOMING.

(The numbers used refer to Dana's Mineralogy.)

GRAPHITE.—No. 2. Amorphous varieties have been reported from Laramie, Albany, Carbon, Converse and Fremont Counties. Foliated graphite has been found at Halleck Cañon. This mineral is used for lead pencils, stove polish, crucibles and paint.

SULPHUR.—No. 3. Native sulphur occurs in large deposits in Big Horn and Uinta Counties.

BISMUTH.—No. 11. Bright particles of metallic bismuth are found at Jelm Mountain, Albany County, associated with a carbonate of bismuth.

GOLD.—No. 14. In placers and quartz veins in all of the mountain ranges in the State. Beautiful crystals are found in Douglas Creek placer mines.

COPPER.—No. 15. At Tie Siding, Albany County, nuggets of copper have been found that would weigh from ten ounces to 200 pounds. It has also been found in numerous other localities.

MERCURY.—No. 16. Found in the King David mine, Silver Crown, Laramie County, on the 115-foot level.

PLATINUM.—No. 22. Associated with placer gold mines on Douglas Creek, Albany County.

IRON.—No. 25. Meteoric, found in Laramie County, 1887.

REALGAR.—No. 26. Associated with arsenical gold ores in Fremont County, and found in the vicinity of Cokeville, Uinta County.

ORPIMENT.—No. 27. Associated with realgar in Fremont and Uinta Counties.

STIBNITE.—No. 28. Hartville, near Whalen Cañon, Laramie County.

HOLYBDENITE.—No. 34. Laramie, Albany, Johnson, Fremont and Big Horn Counties. This mineral is usually found in thin scales and resembles graphites. It is also often mistaken for lead ore. It has no commercial importance, unless pure and in large veins.

ARGENTITE. (Silver Glance).—No. 42. Runningwater mine, Converse County, and the Wood River Mines, Big Horn County.

GALENA.—No. 45. Common ore in the mountains, usually carrying silver.

CHALCOCITE.—No. 54. A common ore, and usually found very pure. Samples often assay 70 per cent of copper.

SPHALERITE.—No. 5. Only found in the Ferris Mountains.

COVELLITE.—No. 67. Medicine Bow Mountains.

MILLERITE.—No. 70. Reported as occurring with the copper ores from the Ferris Mountains. This has not been confirmed.

PYRRHOTITE.—No. 74. Large veins are known in the vicinity of Laramie Peak.

BORNITE.—No. 78. From the Grand Encampment copper mines.

CHALCOPYRITE.—No. 83. A common copper ore in Wyoming.

PYRITE.—No. 85. Very common. Found in veins and associated with sedimentary rocks.

SPERRYLITE.—No. 93. Associated with the covellite ores of the New Rambler mine, Albany County.

MARCASITE.—No. 96. Found in veins in the Medicine Bow Mountains, not far from La Plata mines.

ARSENOPYRITE.—No. 98. Whalen Cañon and Silver Crown, Laramie County; Medicine Bow Mountains, Carbon County; Atlantic, Fremont County.

KRENNERITE.—No. 105. Based upon the determination of a single specimen found in a quartz vein on Douglas Creek, Albany County.

TETRAHEDRITE. (Gray Copper).—No. 148. From the Sierra Madre Mountains, Carbon County, and Whalen Cañon, Laramie County.

HALITE. (Common Salt).—No. 166. Uinta, Weston, Johnson and Big Horn Counties.

CERARGYRITE. (Horn Silver).—No. 169. Black Buttes mines, Crook County.

FLOURITE.—No. 175. Near Tie Siding, Albany County.

CRYOLITE.—No. 183. Yellowstone National Park.

QUARTZ.—No. 210. 1—Quartz crystals, common.

3. Amethyst, Boulder Ridge, Albany County; Red Desert, Sweetwater County; Amethyst Mountain, Big Horn County.

4. Rose quartz, Crook County.

6. Smoky quartz, Plumbago Cañon, Albany County.

7. Milky quartz, common.

Cryptocrystalline Varieties: 1. Chalcedony, very common and in great variety. Beautiful specimens of mammillary and stalactite chalcedony are found in the northern part of Albany County. Chalcedony geodes occur in Whalen Cañon, Laramie County.

2. Carnelian, Sage Hen Creek, Natrona County.

3. Chrysoprase, Fremont County, and in the vicinity of Agate Lake, Natrona County.

4. Prase.

6. Agates; a. Banded, Fremont, Natrona, Albany and Sweetwater Counties. Beautiful fortification agates in Bridger eocene.
b. Clouded agates, common.
c. Moss agate, beautiful specimens at Hartville and Chugwater Creek, Laramie County, and Split Rock, Natrona County.

Agatized wood, common.

9. Agate jasper, Carbon and Albany counties.
11. Flint, very common.
12. Hornstone, Fremont County
14. Jasper, abundant and in great variety, besides the above.
Quartzite very abundant.

TRIDYMIT.—No. 211. Sweetwater County, associated with late eruptives

OPAL.—No. 212. Fremont, Uinta, Natrona and Albany Counties
Precious opals not known. Opalized wood in many localities.

CUPRITE.—No. 224. Silver Crown, Laramie County and Rock Creek, Carbon County.

TENORITE.—No. 230. Michigan and Sunrise mines, Laramie County.

CORUNDUM.—No. 231. Wind River Mountains.

HEMATITE.—No. 232.

1. Specular, Laramie Peak and Tie Siding, Albany County.
2. Compact columnar, Hartville, Laramie County.
3. Red Ochreous, Hartville, Rawlins and Seminoe.
4. Clay ironstone, common in the Cretaceous rocks.

ILMENITE.—No. 233. Iron Mountain, Albany County.

MAGNETITE.—No. 237. Laramie Mountains, Laramie and Albany Counties.

CHROMITE.—No. 241. Dutton Creek, Carbon County.

MINIUM.—No. 244. Lenox mine, Silver Crown.

CASSITERITE (black tin).—No. 248 Black Hills, Crook County.

RUTILE.—No. 250. Associated with the Leucite rocks of Sweetwater County and also found in quartz nodules in schist near the Big Creek mine, Carbon County.

PYROLUSITE.—No. 254. Albany, Crook and Uinta Counties.

TURGITE.—No. 255. Crook County.

MANGANITE.—No. 258. Albany County.

LIMONITE.—No. 259. Miner's Delight, Fremont County; Medicine Bow Mountains; good crystals limonite after pyrites.

PSILOMELANE.—No. 269. Warren's Peak, Cook County.

CALCITE.—No. 270. Varieties based chiefly upon crystallization and accidental impurities:

1. Dogtooth spar, beautiful crystals at Cold Springs, Laramie County; nailhead spar, Table Mountain cavern.
2. Satin spar, Rock Creek, near the old stage crossing.
3. Granular limestone, common in carboniferous rocks.
Hard compact limestone, very common.
Lithographic stone, Vermillion Creek, Sweetwater County.
Hydraulic limestone, quite common.

Marbles in variety, general.

Onyx marble, Hartville and Cokeville.

Stalactites, Table Mountain cavern.

Stalagmites, Table Mountain cavern.

Travertine, Table Mountain cavern.

Dolomitic calcite, near Laramie.

DOLOMITE.—No. 271. Twelve miles west of Uva, Laramie County.

SIDERITE.—No. 273. Fremont, Big Horn, Albany and Carbon Counties—extent of deposits not known.

ARAGONITE.—No. 277. Perfect crystals near the Big Horn Hot Springs. Pseudomorphs after Hanksite, Albany County. Massive near Cody, Big Horn County.

CERUSSITE.—No. 281. Lenox mine, Silver Crown, Laramie County.

BISMUTOSPHAERITE.—No. 283. McMullen mine, Jelm Mountain, Albany County.

MALACHITE.—No. 288. Very common—good crystallized specimens at the Sunrise mine, Hartville.

AZURITE.—No. 289. Very common.

NATRON.—No. 296. Sweetwater soda mines, Natrona County.

TRONA.—No. 299. From the same deposits as natron.

ORTHOCLASE.—No. 313. Very common. Valuable veins near Whalen Cañon Laramie County.

SANIDINE.—Sundance, Crook County.

MICROCLINE.—No. 314. Halleck Cañon, Albany County.

ANORTHOCLASE.—No. 315. Obsidian Cliff, Yellowstone Park.

OLIGOCLASE.—No. 316. Laramie, Albany, Carbon and Fremont Counties.

LABRADORITE.—No. 319. Common in the Laramie Mountains.

LEUCITE.—No. 321. Leucite Hills, Sweetwater County.

PYROXENE.—No. 325. Very common in Archean rocks. Variety Augite associated with the eruptive rocks.

ACMITE.—No. 326. Associated with the Leucite rocks of Sweetwater County.

PECTOLITE.—No. 330. Ferris Mountains, Carbon County.

ANTHOPHYLLITE.—No. 337. Near Owen, Albany County.

AMPHIBOLE.—No. 338. Varieties:

a. Hornblend, common in the Archean rocks.

b. Actinolite, common in the crystalline schists.

CROCIDOLITE.—No. 341. Bradley's Peak, Carbon County, associated with epidiorite.

BERYL.—No. 344. Large crystals are numerous east of Whalen Cañon, Laramie County.

NOSELITE.—No. 364. Leucite Hills, Sweetwater County.

GARNET.—No. 370. Common in great variety:

Grassularite, Laramie Mountains.

Pyrope, Laramie and Medicine Bow Mountains.

Massive garnet, Boulder Ridge, Albany County.

- CHRYSOLE. —No. 376. Fremont's Peak, Fremont County.
- OLIVINE. —Meeteetse Creek, Big Horn County.
- FAYALITE. —No. 377. Obsidian Cliff, Yellowstone Park.
- ZIRCON. —No. 394. South Pass, Fremont County.
- CYANITE. —No. 400. Medicine Peak, Carbon County.
- GADOLINITE. —No. 404. Near Iron Mountain, Albany County.
- EPIDOTE. —No. 407. Very common in Archean rocks—good crystals near Laramie Peak.
- ALLANITE. —No. 409. From near Iron Mountain, Laramie County.
- TOURMALINE. —No. 426. Laramie Mountains and near Hartville, Laramie County.
- STAUROLITE. —No. 428. Whalen Cañon, Laramie County, and Atlantic, Fremont County.
- MORDENITE. —No. 437. Hoodoo Mountains, Big Horn County.
- MUSCOVITE. —No. 458. Common; large crystals of excellent quality in Whalen Cañon.
- BIOTITE. —No. 462. Very common in Archean rocks.
- PHLOGOPITE. —No. 462 A. Leucite Hills, Sweetwater County.
- LEPIDOMELANE. —No. 462 B. Laramie Mountains.
- SERPENTINE. —No. 481. Natrona, Carbon and Albany Counties.
- Asbestos-chrysolite, same localities.
- TALC. —No. 484. Very common. A good quality of fibrous talc was recently found west of Wheatland.
- SAPONITE. —No. 488. Reported from Crook County—not confirmed.
- KAOLINITE. —No. 492. Impure varieties are common. Under this head there are numerous varieties of clays.
- Bentonite, a new variety found at Rock Creek and Newcastle. This variety is in great demand and the industry is increasing every year.
- CHRYSOCOLLA. —No. 504. Laramie Mountains and Hartville.
- PEROVSKITE. —No. 517. Associated with the Leucite rocks of the Leucite Hills, Sweetwater County.
- COLUMBITE. —No. 525. Nigger Hill, Crook County.
- NEPHELITE. —No. 375. Warren's Peak, Crook County.
- APATITE. —No. 549. Sweetwater County and near Welcome, Crook County.
- OLIVENITE. —No. 561. Essex Mountain, Sweetwater County.
- WAVELLITE. —No. 636. Separation, Carbon County.
- SODA NITRE. —No. 683. Leucite Hills, Sweetwater County.
- NITRE. —No. 684. Leucite Hills, Sweetwater County, and near Dayton, Sheridan County.
- BORAX. —No. 707. Reported from Fremont County—not confirmed.
- THENARDITE. —No. 716. Found in depressions in the arid region.
- BARITE. —No. 719. Red Desert, Sweetwater County; Como Bluff, Carbon County.
- BROCHANTITE. —No. 740. Medicine Bow Mountains, from Rambler mine.
- MIRABILITE. —No. 743. Natural sulphate of soda, common in Wyoming.
- GYPSUM. —No. 746. Very common in thick beds, in Triassic red sandstone.

1. Selenite, crystallized.
2. Fibrous, satin spar.
3. Massive, alabaster.

EPSOMITE.—No. 748. Common; in large deposits in Albany County; also abundant in Sweetwater County.

MELANTERITE.—No. 751. Whalen Cañon and Big Horn County.

BIEBERITE.—No. 754. In thin films on quartz associated with veins in the Seminoe Mountains.

CHALCANTHITE.—No. 755. Silver Crown, Laramie County.

ALUNOGEN.—No. 775. This mineral is usually called alum. It is found in large deposits in Big Horn and Sweetwater Counties. There is a large deposit in a cave in Cedar Mountain near Cody.

WULFENITE.—No. 818. Lenox mine, Silver Crown, Laramie County.

OZOCERITE.—Reported from Fremont County.

SUCCINITE. (Amber).—Found in the coal at various places.

PETROLEUM.—Very common, in great variety.

ASPHALTUM.—Natrona, Fremont and Uinta Counties.

NATURAL GAS.—Fremont and Natrona Counties.

COAL.—Bituminous Weston, Sweetwater, Carbon, Uinta and Johnson Counties.

Semi-anthracite, Buffalo, Johnson and Sweetwater Counties.

Lignite, general.

COUNTIES

ACREAGE, POPULATION AND VALUATION

The State of Wyoming is divided into thirteen counties, as follows:

COUNTY	ACREAGE	POPULATION, 1900	VALUATION, 1908
Albany.....	3,248,640	13,084	\$5,309,946.79
Big Horn.....	7,464,960	4,328	5,522,959.43
Carbon.. ..	5,091,840	9,580	7,278,016.30
Converse.....	4,480,000	3,337	3,836,637.91
Crook.....	3,916,800	3,137	3,200,699.47
Fremont.....	7,833,600	5,357	4,408,866.09
Johnson.....	2,589,840	2,361	2,748,879.50
Laramie.....	4,520,480	20,118	9,592,178.65
Natrona.....	3,320,560	1,785	3,243,316.22
Sheridan.....	1,920,000	5,122	5,653,620.95
Sweetwater.....	5,913,600	8,445	6,790,923.62
Uinta.	9,680,200	12,223	7,345,171.39
Weston.....	3,133,440	3,203	2,567,834.80
TOTAL	63,113,960	92,531	\$67,580,051.12

COUNTIES TRAVERSED BY THE UNION PACIFIC.

LARAMIE COUNTY is in the southeastern portion of Wyoming, and comprises an area of 7,000 square miles. It ranks first in population and wealth, and was one of the original four counties of the Territory of Wyoming. The rolling plains along the eastern slope of the Black Hills range, varying in altitude from 4,000 to 8,000 feet, are its natural features. These plains are peculiarly adapted to grazing. In all parts of the county are found numerous streams. The total acreage of the county is 4,520,480, of which 3,000,000 acres are fine grazing land and 1,000,000 are susceptible of being made rich agricultural lands.

It is full of undeveloped resources; has iron, coal, copper, gold and silver, sandstone, marble, granite, mineral paint and mica. The land is generally free from stones and other obstructions and is easily broken and cultivated. In exceptional seasons the natural rainfall is sufficient to produce a growth of grain and vegetables, but irrigation ditches and a reliable supply of water are necessary to insure the success of farming operations.

Laramie County has passed from a purely pastoral condition to one of mixed husbandry. Stock-raising, farming, dairying and gardening are practiced in varying degrees. The average temperature is about 60 degrees Fahrenheit; the rainfall, fourteen inches. All field crops common to the West succeed well.

ALBANY COUNTY is one of the smallest counties in the State, but one of the most important in many respects. Its area embraces 3,248,640 acres; of this 1,044,000 are listed for taxation, 336,000 as railway grant lands, and 708,000 by individuals. The Laramie Plains comprise about one-half of the area of the county, being in the central part; the Medicine Bow range of mountains being on the west of the Plains and the Laramie range on the east and north. The Plains proper are at an altitude of about 7,000 feet, while the Medicine Bow range rises to the region of perpetual snow.

CARBON COUNTY is well watered by mountain streams, the North Platte River flowing the entire length of the county from south to north. Nearly every portion is abundantly supplied with water for irrigation purposes. The numerous mountain ranges in the county are covered with an excellent quality of pine timber suitable for building purposes and for the manufacture of lumber, as well as for fuel.

The County has an area of 11,061 square miles, a population of 10,313 in 1905, is noted for its vast herds of sheep, its fine cattle, and above all its rich coal and mineral deposits. It is the richest county in mineral resources and stands second to none in its stock raising. The Union Pacific Railroad runs across the county from east to west, giving 103.53 miles of railroad.

Carbon County has a good public school system.

One of the chief industries of the county is live stock, its sheep, cattle, horses and mules being valued at over two million dollars.

The famous copper-mining district of the Grand Encampment is situated twenty miles south of Saratoga, and a full description of it will be found on page 75; the Gold Hill district, which lies to the east of Saratoga some twenty-five miles, also has many valuable leads, which are being systematically developed by eastern capitalists.

Another important product of the county is its coal, of which there are mines located at Carbon, Hanna, Rawlins, Kindt and other points.

The climate of Carbon County is healthful, bracing and invigorating, mild and pleasant during the summer months and not severely cold or uncomfortable in the winter. It is peculiarly suited to the building up of weak lungs and is conducive to health and longevity.

* SWEETWATER COUNTY, in which the towns of Rock Springs and Green River are situated, is well suited to sheep-raising, and many citizens are so engaged. The broken and diversified character of the country, covered as it is with white sage and nutritious grasses, furnishes just the conditions conducive to the successful management of that class of live stock, 450,000 head being run upon the plains.

Probably the entire county is underlaid with veins of coal, which, however, have been more extensively developed at Rock Springs than elsewhere, and the term Rock Springs coal is synonymous throughout the West with coal of exceptional quality. The Union Pacific Coal Company is the largest operator, although there are others located at or near Rock Springs. This company owns five mines, the Central Coal & Coke Company two, and the others are the property of individuals. In addition to obtaining a full supply of fuel for the Union Pacific Railroad, the first named company sells thousands of carloads throughout Wyoming and adjacent States.

There are vast areas of undeveloped coal lands in the county, principally to the north of the railroad, much of which on being prospected shows excellent coal in veins from three to twelve feet thick.

UINTA COUNTY, in which the towns of Evanston, Spring Valley and Hilliard are situated, lies in the extreme western portion of the State and extends from the northern boundary of Utah to the southern boundary of the Yellowstone National Park. It covers over 15,000 square miles, and much of this vast area is unentered Government land. The Union Pacific Railroad crosses the county in its southern portion, and the Oregon Short Line in the south central portion. The elevation ranges from 5,000 to 8,000 feet.

The famous Jackson Hole and Jackson Lake lie in the northern part of the county, south of the Yellowstone National Park.

Jackson Hole is an extensive valley of fertile land and some good farms, and is traversed by Snake River and numerous creeks.

Prior to 1871 Jackson Hole was practically unknown to others than the hardy trapper and prospector, and it was not then supposed that this great valley would one day become an important part of the body politic of the State of Wyoming, and that magnificent farms and homes would cover its fertile expanse and drive out the wild game, in its last retreat before the perpetual blow of advancing civilization. In 1884 the first settlement was made on the Little Gros Ventre River; from this nucleus has sprung a hardy pioneer opposition to the inclemencies and vicissitudes of the seasons, and to-day ranching and stock raising are carried on with success and thousands of acres of barren lands have been reclaimed from nature's grasp and have been improved into great bodies of the finest hay and farming lands in the State.

The production of timothy and wild hay, alfalfa, oats, potatoes, winter wheat, and in some sections barley, occupies the whole attention of Uinta County farmers. Possessing a soil singularly fertile and lasting, this county offers exceptional inducements to the agriculturist, with the assurance that the waters will never fail, that his crops will never be blighted by drouth and abundant harvest will surely follow seed-time.

Throughout the county timber is abundant on the hill-sides for lumber, fuel and mining purposes. Yellow and white pine, some cedar and spruce, cottonwood and aspen, are the principal growths. Saw mills are in operation in many portions of the county, and much lumber is produced.

CITIES, TOWNS AND SETTLEMENTS

CHEYENNE.

Cheyenne is the county seat of Laramie county and the capital of the State and has a population of 16,000. Owing to the rapid advancement of Cheyenne after the settlement in 1867, it gained the title of "The Magic City," and has always been noted for the wealth and enterprise of its citizens. The city was designated as the capital when Wyoming Territory was organized in 1869. It is 516 miles west of Omaha, on the line of the Union Pacific; is also the junction point of the Colorado & Southern and the terminus of the Cheyenne & Burlington, a branch of the Burlington System.

Cheyenne has one of the finest waterworks systems in the West, construction of which was begun in 1882, and has cost to date one-quarter of a million dollars. There are three reservoirs of 200,000,000 gallons and one of 100,000,000 gallons capacity. Cheyenne also has one of the largest shop plants on the Union Pacific, capacity 1,200 men; the latest and most approved sewerage system, fire department and fire alarm system, telephone exchange, arc and incandescent electric lighted streets, besides gas for general use; has a \$50,000 opera house, \$30,000 club house, fine business blocks, elegant private residences, banks, churches, two daily newspapers, and State Capitol costing \$400,000. Among the other institutions are five public school buildings, built at an average cost of \$30,000; convent school, erected at a cost of over \$50,000; a county hospital; a county court house and jail; a State Soldier's and Sailor's Home. Andrew Carnegie gave \$50,000 for the construction of a public library, which is now built. The city is the supply point for an immense stock-raising and agricultural country, and its citizens are among the largest live stock owners in the State.

Three miles northwest of the Union Depot is located what, from many standpoints, is considered the most important military post between New York and San Francisco.

In 1867 a regular encampment of the United States Army was established at Cheyenne. This afterward became a regimental post and was named after General David A. Russell, the post since being known as Fort D. A. Russell.

During the days of Indian excitement, especially in 1875 and 1876, Fort Russell was used as a supply depot for the western posts and it was here that troops were concentrated for the movements against the Indians.

Fort Russell is still a regimental post, although it has been selected by the War Department to be named as a brigade post; and while the buildings already erected at Fort Russell are of an exceptionally high order of architecture, fully \$2,000,000 have been appropriated in behalf of the War Department for the construction of additional buildings.

The post is now about one-half completed, and when the last building is finished and the brigade installed, the four branches of the service will be represented by more than six thousand officers and men.

The military reservation comprises 6,392 acres, the southeasterly corner being practically at the Cheyenne city limits.

The City of Cheyenne has cut a 100-foot boulevard diagonally through several blocks from the State Capitol building to the edge of the military reservation, where it joins a similar boulevard upon which are constructed the main buildings of the Fort. Competent landscape gardeners have been employed and are making of Fort Russell one of the most attractive military posts in the United States. Fort Russell is connected with the city of Cheyenne by an electric railway. Located as it is geographically, it is possible upon short notice to transport troops north, south, east or west over transcontinental lines, and thus strategically Fort Russell occupies an important military position.

Directly west of Cheyenne is one of the most ideal army maneuver camps in the world, and here, each year, from twenty to twenty-five thousand men are assembled [for practical training in field discipline. This camp is located upon a flat plateau surrounded by a high range of mountains projecting sharply up from the plains, has an unusually pure water supply, and is easily reached by carriage or automobile from the city of Cheyenne.

The new electric light plant cost \$100,000 and the Roman Catholic Cathedral the same amount; the city water works cost Cheyenne \$600,000; Elks' club \$50,000, two new theaters \$140,000 and the Governor's mansion \$40,000, while the new Union Pacific shops represent an investment of \$3,000,000.

There are a number of fine resorts near here among which are Hereford Grove, Chalk Bluffs, Silver Crown and Natural Fort. Soldiers' Home for State of Wyoming is located here. The Goshen Hole Irrigation Company's enterprise will cover nearly 250,000 acres of the finest tracts of farming lands in the State of Wyoming. Wyoming Development Company has 60,000 acres under irrigation. The soil is a rich sandy loam, heavy enough not to lift after plowing, it is particularly adapted to growing grain, vegetables, hardy fruits, native grasses, alfalfa, potatoes, and gives large crops. A dry and bracing atmosphere of unusual coolness is a characteristic climatic condition, and the city sewerage system is highly commendable from the standpoint of public health.

LARAMIE.

The county seat of Albany County, population 8,700, is situated at the crossing of the Big Laramie River, near the central portion of the Plains. Here is located the University of Wyoming. The faculty is composed of educators of eminent ability in the several branches; the School of Mines gives a thorough course in mineralogy and assaying; the Agricultural College Department conducts an experimental farm in connection with the institution, demonstrating that farming and the raising of nearly all of the agricultural products can be carried on profitably on the mountain plateaus at this altitude. The city is lighted by electricity, and has a fine system of free waterworks.

Several sawmills in the adjacent mountains supply native lumber for all purposes. Brick is made of good quality, and building stone of good color and excellent quality is found in abundance near the city. The university and cathedral, two fine structures, are built of the native stone.

The State Fish Hatchery, an institution of great value to the State in supplying and stocking the different streams of the State with game fish, is a short distance from the city on one of the mountain streams.

The county has a fine public school system and the high school at Laramie is the equal of many similar institutions in larger cities.

Laramie is the outfitting and supply point for North Park, Colo., Big Laramie, Sibylle, Cummins, Douglas Creek, Centennial, La Plata, Gold Hill, Rock Creek, Grand Encampment, Hahn's Peak, Independence Mountains and other mining camps.

The Laramie Steel & Iron Company is the largest manufacturing concern in the State, owning and operating a well-equipped rolling mill and machine shop. This company gives constant employment to 150 men, turning out a large tonnage of merchant iron and railway supplies. The Standard Cement Plaster Company has a fine plant and an unlimited supply of material from which to manufacture its product, which is shipped both east and west in large quantities. The Rocky Mountain Plaster Company at Red Buttes has a plant of large capacity and makes a fine grade of white finish from the gypsum beds in that vicinity.

The principal industrial wealth of the county is in its grazing and livestock interests, cattle, sheep and horses leading in the order named. Agriculture is being more extensively engaged in now than in years past. Large yields of wheat, oats and barley are produced annually and command a higher price than in any other market. Mining for the precious metals has greater promise now of coming to the front and supplanting all other industries than it has had heretofore. The Medicine Bow Range is strictly a mineral-bearing formation. Fine ore croppings are found distributed throughout its entire area.

RAWLINS.

Rawlins is on the Union Pacific, and is the seat of Carbon County. Altitude, about 7,000 feet; it has a population of about 2,500; has round-houses and extensive machine shops. It is a distributing point for an outlying country both north and south of the railroad. Daily and tri-weekly stages leave here for points north and south. The new State penitentiary, costing \$100,000, is here, and also a substantial stone court house and a fine public school building, which cost, respectively, \$50,000 and \$35,000. Here are located and operated fine building stone quarries, the Rawlins sandstone being shipped out of the State both east and west. Here also are the great mineral red paint mines (known as Rawlins Red), from which the paint for the Brooklyn bridge was procured. This ore is shipped to Denver

and much used by the smelters as a flux. Pressed bricks of a high grade are produced here. The city is also the supply point for and the headquarters of a vast sheep and wool industry.

SARATOGA.

Saratoga is situated on the North Platte River, twenty-eight miles south of Fort Steele, in the center of a beautiful valley; population, 1,500. Has a bank, flouring mill, public library, four hotels, and a good representation of merchandising establishments. It takes its name from the hot springs of mineral water found there, the waters of which possess wonderful curative properties. By all who have ever tried them, they are pronounced to be not merely "as good" as other medicinal hot springs, but the best they know.

It has a daily mail from Walcott—twenty-three miles—the nearest railroad point, and is the distributing point for the towns of Collins, Bennett, Mead, French, Encampment, Battle, Rudefeha, Copperton and Pearl, Colorado, and is an outfitting point for the Grand Encampment mines.

ENCAMPMENT.

Encampment is a town of recent origin, brought forth by the prospects of the new gold and copper mines recently opened up in the Grand Encampment district. It has a population of 600 and is the supply point for the mining district. It has a 100-ton smelter. It is situated on the Grand Encampment River, twenty miles south of Saratoga.

ROCK SPRINGS.

Rock Springs, named after a spring that boiled up near the foot of the bluff, is situated eighteen miles east of Green River in Sweetwater County, on the Union Pacific, and is a mining city of 4,700 inhabitants, in the best coal-producing county in the Rocky Mountains. The Rock Springs coal is justly celebrated from the Pacific Ocean to the Missouri River. The city has a waterworks system which cost over \$200,000. Its streets and buildings are lighted with arc and incandescent electric lights. It has two banks, two newspapers, four schools, four churches, a volunteer fire department, suitable hotels, excellent commercial houses and numerous residences. The Wyoming State Hospital is here. Perhaps no city or town in Wyoming is increasing in population, wealth and general importance as rapidly as Rock Springs. The coal mines here furnish employment for 3,500 men. The city formerly contained several hundred Chinamen, but the number has been reduced about one-half, and these are gradually giving way to other classes of laborers.

GREEN RIVER.

Green River, population 1,014, the seat of Sweetwater County, is on Green River, at the crossing of the Union Pacific. The town is maintained by the

trade derived from the settlements above and below the river, and the railroad shops. It is well lighted by electricity, has a good water system, and the municipal government is supported without taxation other than license taxes.

A saw mill, a steam sheep shearing plant, and the plant of the Green River Fuel & Oil Company are among the notable business features of this place. Here, too, a remarkably pure quality of crude soda has been found, which is practically purer than the sal soda of commerce, and the cheapness with which it can be produced offers a great inducement for the investment of capital.

EVANSTON.

Evanston, the seat of Uinta County, population 3,500, is pleasantly situated in the Bear River Valley; has many natural advantages and is one of the most prosperous and attractive towns in the State. It is the home of prosperous merchants, cattlemen and sheepmen; Union Pacific shops are located here, and there are two banks, three newspapers, five churches, commodious brick school house, large court house and jail, electric light plant, waterworks and three hotels. The State Insane Asylum is situated here, and also the United States Land Office for Evanston District.

Diamondville and Kemmerer are the principal towns on the Oregon Short Line, and are large coal producers.

The coal of Uinta County is but slightly exposed, being largely covered by the tertiary; and it is only where recent erosion has occurred that the coal outcrops. Owing to this fact it may be years before the full extent of the coal lands of Uinta County is thoroughly known. The coal mines at Frontier and Diamondville are of great importance, and ship many hundred thousand tons of coal annually to Idaho and Montana. The coal at Frontier, Diamondville, Cumberland and Spring Valley is found in the same formation, which is upward of 5,000 feet below the greatest coal bearing formation of Wyoming. The coal taken from these veins is the best steaming coal found in Wyoming.

At Spring Valley, Fossil and near the old Carter oil well there was an extended oil excitement a few years ago. No less than fifteen rigs were at work and oil was found in several wells, two or three of which are better than twenty-barrel wells. The oil from this region is a superior paraffin variety, and of exceptional purity.

Star Valley, a fine agricultural section 125 miles distant from the county seat, is traversed by Salt River, Cottonwood Creek, mountain streams and many large canals and laterals. The population is about 2,700. The people, mostly Mormons, are thrifty and prosperous. They raise timothy and alfalfa, hay, oats, barley and winter wheat, large crops of potatoes and garden truck, and in agricultural wealth and splendid ranges for cattle rival the people of the southern end of the county.

ELEVATION

HYPSONOMETRIC AREAS

The following table contains the hypsometric areas or elevations of land in Wyoming:

	SQUARE MILES
Area between 3,000 and 4,000 feet.....	3,000
Area between 4,000 and 5,000 feet.....	19,000
Area between 5,000 and 6,000 feet.....	20,000
Area between 6,000 and 7,000 feet.....	24,000
Area between 7,000 and 8,000 feet.....	17,000
Area between 8,000 and 9,000 feet.....	7,200
Area between 9,000 and 10,000 feet.....	4,300
Area between 10,000 and 11,000 feet.....	2,300
Area between 11,000 and 12,000 feet.....	900
Area between 12,000 and 13,000 feet.....	100
Total.....	97,800

ALTITUDES OF CITIES AND TOWNS

The following table shows the altitudes of the various cities, towns, camps, and forts named:

NAME	ALTITUDE FEET	NAME	ALTITUDE FEET
Archer.....	6,005	Hallville.....	6,590
Aspen.....	7,809	Hampton.....	6,500
Allen.....	6,615	Hanna.....	6,769
Almy.....	6,820	Harney.....	7,882
Atlantic City.....	7,666	Hartville.....	4,700
Barrel Springs.....	6,854	Hazard.....	6,357
Baxter.....	6,306	Hillsdale.....	5,626
Bitter Creek.....	6,692	Howell.....	7,114
Black Butte.....	6,612	Independence Rock.....	6,187
Boleter.....	4,325	Jackson's Hole.....	6,000
Bosler.....	7,079	Laramie.....	7,145
Bridger.....	6,758	Latham.....	6,900
Bryan.....	6,186	Lander.....	5,377
Buford.....	7,858	Lawrence.....	6,200
Camp Brown, (old Fort Washakie)...	5,447	Leroy.....	6,699
Camp Brown.....	5,498	Lookout.....	7,184
Camp Stambaugh.....	7,767	Marston.....	6,213
Camp Walbach.....	6,449	Medicine Bow.....	6,560
Carbon.....	6,758	Miller.....	5,908
Carter.....	6,491	Millis.....	6,790
Cheyenne.....	6,050	Mud Volcanoes, Yellowstone Park..	7,712
Cheyenne Signal Bureau.....	6,058	Otto.....	6,754
Church Buttes.....	6,298	Pacific Springs.....	7,144
Como.....	6,691	Percy.....	6,951
Cooper's Lake.....	7,081	Piedmont.....	7,072
Creston.....	7,102	Pierre's Hole.....	6,515
Dana.....	6,962	Pine Bluff.....	6,400
Deer Creek Agency, abandoned.....	5,000	Point of Rocks.....	6,503
Devil's Gate.....	6,028	Rawlins.....	6,741
Edson.....	6,619	Red Buttes.....	7,300
Egbert.....	5,276	Red Desert.....	6,699
Encampment Meadows.....	8,171	Rock Creek River.....	6,704
Evanston.....	6,739	Rock Springs.....	6,256
Fairbank.....	4,620	Rock River.....	6,904
Fillmore.....	6,667	Sand Creek, Albany County.....	7,500
Fort Aspeneut, abandoned.....	7,630	St. Mary's.....	6,265
Fort Bridger, abandoned.....	6,753	Salt Wells.....	6,753
Fort Fetterman (Platte), abandoned	4,973	Separation.....	6,897
Fort Halleck, abandoned.....	7,800	Sherman.....	8,010
Fort Laramie, abandoned.....	4,519	Simpson.....	6,904
Fort Phil Kearney, abandoned.....	6,000	Solon.....	6,925
Fort Piney, abandoned.....	7,580	South Pass.....	7,857
Fort Russell.....	6,455	Sulphur Springs, Yellowstone Park..	7,088
Fort Sanders, abandoned.....	7,166	Sun Dance.....	4,750
Fort Stambaugh, abandoned.....	7,684	Sweetwater Bridge.....	7,000
Fort Steele.....	6,505	Table Rock.....	6,835
Gardner's River Spring, Yellow-		Three Crossings.....	6,134
stone Park.....	6,100 to 6,500	Walback Springs.....	6,297
Geyser Basin, Lower.....	7,250	Walcott.....	6,618
Geyser Basin, Upper.....	7,400	Wamsutter.....	6,702
Granite Cañon.....	7,312	Washakie.....	6,691
Granger.....	6,264	Wilcox.....	7,033
Green River.....	6,077	Wyoming City.....	7,077
Grenville.....	6,582		

DISTANCES FROM CHEYENNE.

Official distances from Cheyenne to the places named are shown in the table which follows:

PLACE	MILES	PLACE	MILES
Boston, Mass.....	2,151	Jacksonville, Fla.....	1,901
Baker City, Oregon.....	946	Kansas City, Mo.....	716
Blackfoot, Idaho.....	595	Laramie, Fort, Wyo.....	88
Boulder, Col.....	92	Laramie, Wyo.....	57
Carter, Wyo.....	388	Lincoln, Neb.....	455
Chicago, Ill.....	1,006	Little Rock, Ark.....	1,186
Cincinnati, Ohio.....	1,233	Los Angeles, Cal.....	1,552
Cleveland, Ohio.....	1,350	Louisville, Ky.....	1,194
Custer, Fort, Mont.....	449	McKinney, Fort, Wyo.....	322
D. A. Russell, Fort, Wyo.....	3	Milwaukee, Wis.....	1,026
Davenport, Iowa.....	836	Minneapolis, Minn.....	880
Deming, N. Mexico.....	868	Montreal, Canada.....	1,843
Denison, Tex.....	1,038	New York City, N. Y.....	1,918
Denver, Col.....	106	Ogden, Utah.....	515
Des Moines, Iowa.....	660	Omaha, Neb.....	516
Detroit, Mich.....	1,278	Philadelphia, Pa.....	1,827
Dubuque, Iowa.....	853	Portland, Oregon.....	1,303
Evanston, Wyo.....	439	Providence, R. I.....	2,011
Fetterman, Fort, Wyo.....	189	Rawlins, Wyo.....	193
Fort Worth, Tex.....	1,169	Rochester, N. Y.....	1,582
Fred Steele, Fort, Wyo.....	178	St. Louis, Mo.....	929
Fremont, Neb.....	470	Salt Lake City, Utah.....	552
Galveston, Tex.....	1,432	San Diego, Cal.....	1,649
Granger, Wyo.....	359	San Francisco, Cal.....	1,348
Green River, Wyo.....	329	Santa Fe, N. M.....	588
Hartford, Conn.....	1,939	Sidney, Neb.....	102
Helena, Mont.....	922	Washakie, Fort, Wyo.....	340
Indianapolis, Ind.....	1,122	Washington, D. C.....	1,819
Jackson, Miss.....	1,414		

BANKS

TEN YEARS GROWTH.

In all the larger towns of the State are located national banks, while in the smaller towns are found banks incorporated under the State law or operating as private banks. The legal rate of interest is eight per cent, but any rate agreed upon, not exceeding twelve per cent per annum, is valid. The bank rate on time deposits is four per cent. Bank loan rate, ten and twelve per cent.

State Bank Examiner H. B. Henderson, in his abstract of reports January 1, 1909, on the National, State and Private banks in Wyoming says: "Figures are uninteresting and statistics dry reading, except in the eye of the economist, unless they tell a story of achievement or disaster. This booklet tells of development, progress and success; it tells of the men who manage our financial institutions, their character, habits, ability and integrity; it tells of the people who constitute our State. It is a graphic story, more interesting than the latest novel, because it is true. In ten years we have grown from twenty-six to seventy-five banks, from assets of five million seven hundred and fifty thousand to twenty-two million seven hundred and sixty thousand dollars, an increase of seventeen million dollars in banking resources, and our development has only begun."

Following is a consolidated statement of all banks in the State of Wyoming at the close of business on November 10, 1904, November 9, 1905, November 12, 1906, December 3, 1907, and November 27, 1908:

RESOURCES	1904	1905	1906	1907	1908
Loans and Discounts.....	\$ 7,106,133.86	\$ 8,538,582.82	\$11,195,270.64	\$13,096,954.07	\$13,052,405.90
Overdrafts.....	251,938.61	236,123.57	324,688.28	267,594.98	327,561.60
U. S. Bonds and Premiums..	716,204.06	706,549.06	1,391,232.57	1,912,196.77	1,972,546.75
Stocks, Securities, Claims, etc.	398,500.34	481,584.24	513,205.75	575,880.06	675,354.86
Banking House, Furn. & Fix.	170,211.92	179,692.37	209,755.93	386,108.64	408,818.41
Real Estate & Mortgages....	48,834.42	61,584.84	58,925.18	26,690.64	29,541.78
Due from Banks and Bankers	3,254,216.71	4,860,443.52	5,962,769.41	4,854,746.98	4,873,326.77
Checks and other Cash Items	43,157.82	52,524.01	76,673.00	139,756.04	77,714.02
Specie, Legal Tender, National Bank, Notes, Nickels and Pennies.....	599,526.95	768,170.26	917,285.62	1,746,764.49	1,203,748.99
Redemption Fund.....	25,762.50	28,597.50	38,250.00	53,002.50	59,677.50
Due from U. S. Treasurer...	1,900.00	2,030.00	1,900.00	1,250.00	2,010.00
	\$12,616,387.19	\$15,915,882.19	\$20,689,956.38	\$23,060,945.17	\$22,682,705.77

LIABILITIES	1904	1905	1906	1907	1908
Capital Stock Paid In.. ...	\$ 1,600,500.00	\$ 1,667,500.00	\$ 2,136,500.00	\$ 2,429,850.00	\$ 2,491,000.00
Surplus Fund.....	308,222.08	346,204.21	510,253.77	886,300.00	1,012,651.80
Undivided Profits, Less Exp.	472,425.31	630,514.42	651,823.96	699,401.66	859,218.65
Nat. Bank Notes Outstanding	515,250.00	579,350.00	764,050.00	1,136,849.00	1,191,150.00
Individual Deposits.....	8,846,135.44	11,617,304.90	14,666,857.71	15,682,856.28	15,029,999.10
United States Deposits....	141,087.74	114,533.73	597,408.07	725,477.43	713,231.04
Due to Banks and Bankers..	668,599.97	905,637.04	1,347,793.01	1,223,266.33	1,111,027.84
Notes and Bills Rediscounted, Bills Payable..	64,166.65	54,837.89	15,269.86	93,315.92	109,422.83
Loans Sold.....	.....	.....	.....	183,628.55	165,004.51
	\$12,616,387.19	\$15,915,882.19	\$20,689,956.38	\$23,060,945.17	\$22,682,705.77

Following is a comparative statement of the deposits and assets of National, State and Private Banks of the State of Wyoming, December 1, 1898, and November 27, 1908:

	BANKS REPORTING		DEPOSITS		TOTAL ASSETS	
	1898	1908	1898	1908	1898	1908
National Banks..	11	28	\$ 2,803,962.51	\$11,369,844.38	\$ 4,169,141.46	\$16,554,309.74
State Banks	6	42	286,926.57	3,990,177.90	400,062.86	5,740,863.83
Private Banks...	9	5	984,691.81	383,207.86	1,189,486.01	473,685.73
	26	75	\$ 4,075,580.89	\$15,743,230.14	\$ 5,758,690.33	\$22,768,859.30

DIRECTORY OF WYOMING BANKS.

Afton	Afton State Bank	Douglas.....	First National Bank
Baggs.....	First State Bank of Baggs		Douglas National Bank
Basin.....	Big Horn County Bank	Encampment	The North American Trust Co.
	Basin State Bank	Evanston....	First National Bank
Buffalo.....	First National Bank		Evanston National Bank
	Stockgrowers' Bank	Garland	Garland State Bank
	Wyoming Loan and Trust Co.	Gillette.....	Bank of Gillette
Burlington...	Burlington State Bank		Stockmen's Bank
Casper.....	Casper National Bank	Glenrock....	Glenrock State Bank
	Stockmen's National Bank	Greybull....	Williams & Co. Bankers
Centennial...	Centennial Trust Company		Wyant & Co. Bankers
Cheyenne....	Stock Growers' National Bank	Green River .	Morris State Bank
	First National Bank		Green River State Bank
	Citizens' National Bank	Guernsey....	Guernsey State Bank
Cody	Shoshone National Bank	Hanna.....	Carbon State Bank
	First National Bank	Hulett	Hulett State Bank
	Stockgrowers' Bank	Kemmerer...	First National Bank
Dayton.....	The Dayton Bank	Lander.....	First National Bank
Dixon	Stockgrowers' Bank		Noble, Lane & Noble, Bankers

DIRECTORY OF WYOMING BANKS—CONTINUED.

Laramie	First National Bank	Saratoga	Saratoga State Bank
	Albany County National Bank		First National Bank
Lovell	Lovell State Bank	Sheridan	Bank of Commerce
Lusk	Bank of Lusk		Sheridan Banking Company
Luther	The Luther State Bank		First National Bank
Manville	Bank of Manville		Sheridan National Bank
Meeteetse	First National Bank		Sheridan County Savings Bank
	State Bank of Meeteetse		State Loan & Trust Company
Moorcroft . . .	The Moorcroft Bank	Shoshoni	First National Bank
Newcastle . . .	First National Bank	Sundance	Sundance State Bank
	Stockgrowers & Merchants Bank	Thermopolis . .	First National Bank
	Weston County Bank		The Wyoming Trust Company
Pine Bluffs . .	Pine Bluffs State Bank		of Thermopolis
Powell	The First State Bank of Powell		Thermopolis State Bank
Rawlins	Rawlins National Bank	Torrington . . .	First National Bank
	First National Bank	Upton	Upton State Bank
Rock River . .	Cosgriff & Fuller, Bankers	Wheatland . . .	Wheatland State Bank
Rock Springs .	Rock Springs National Bank		Ayers & Co., Bankers
	First National Bank	Wiley	Wiley State Bank
Riverton . . .	Riverton State Bank	Worland	First National Bank

CORPORATIONS.

ESSENTIAL FACTS OF STATE LAW.

The following are the essential facts required to be shown by the certificate of incorporation of every company incorporated under the Wyoming State laws by any three or more persons:

The name of the proposed company.

The object, which must not include more than one general line of business.

The amount of the capital stock.

The number of shares into which the capital stock is divided.

The term of existence, not to exceed fifty years.

The number of trustees, and their names, who shall manage the affairs of the company for the first year—not to be less than three nor more than nine.

The name of the town and county in Wyoming where the principal office of the company shall be located and where the operation of the company shall be carried on; if organized for the purpose of carrying on part of its business outside the State of Wyoming the certificate shall so state.

One certificate shall be filed in the office of the Secretary of State and a duplicate shall be filed in the office of the County Clerk of the county in which the principal office is located. Carbon copies of certificates of incorporation are not accepted by the Secretary of State.

Stockholders' meetings must be held within the State; meetings of the trustees may be held as provided in the by-laws of the company.

The following are the fees prescribed by law, and must be paid in advance:

For filing and recording certificates of incorporation with capital stock of not more than \$5,000	\$ 5.00
When capital stock exceeds \$5,000, but does not exceed \$100,000	\$10.00

When capital stock exceeds \$100,000 a fee of five cents is charged for each \$1,000 of capital in excess of \$100,000, making \$5.00 for the second and each additional \$100,000 of stock capital.

For filing each paper other than those noted above	\$1.00
For recording the first folio, \$1.00; additional folios . . . . .	.15

For filing and recording certificate of corporate seal the rate above.

For filing certificate of paid-up stock.....	\$1.00
For pamphlet copy corporation laws.....	1.50
For certified copy corporation laws.....	2.50

For copy of any law or document on file in Secretary's office, 15 cents per folio of 100 words.

For certificate and seal.....	\$1.00
For filing acceptance of Constitution.....	2.50

In Wyoming no charter is issued, a certified copy of the original certificate of incorporation being received as evidence of incorporation.

Blanks for incorporating companies are not furnished by the Secretary of State's office.

Foreign corporations desiring to operate in Wyoming are obliged to file in this office and in the office of the County Clerk of the county or counties in which they desire to do business a certified copy of their articles of incorporation and of the corporation laws of the State under which organized. They must also file in the office of the Secretary of State an acceptance of the Constitution of Wyoming, a blank form being furnished upon request. Filing fees are the same as for domestic corporations.

The corporation laws of Wyoming are very liberal and have advantages over those of other States.

A list of the names of corporations in the State will be furnished on application to the Secretary of State.

COST OF LIVING.

RETAIL PRICES OF STAPLES.

The following are about the retail prices, at distributing points in Wyoming, of staple articles:

Flour, first grade, Colorado.....	per cwt	\$2.25	
Flour, first grade, Nebraska.....	do	3.75	
Flour, second grade, Nebraska.....	do	2.50	to \$3.00
Potatoes.....	do	1.00	1.60
Beef by quarter.....	do	6.00	8.00
Mutton.....	do	6.00	8.00
Veal.....	do	10.00	12.00
Wheat.....	do	1.50	1.75
Corn, cracked, Nebraska.....	do	1.00	1.50
Oats.....	do	1.00	1.50
Corn meal.....	do	1.50	2.00
Sugar, granulated.....	do	5.00	6.00
Salt, Liverpool.....	do	1.50	3.00
Bacon.....	per lb.	.15	.20
Lard, grocers'.....	do	.15	.18
Chickens.....	do	.15	.20
Turkeys.....	do	.18	.25
Kerosene.....	per gal	.20	.30
Coal.....	per ton	2.50	6.00
Hay, in town.....	do	8.00	14.00
Hay, on ranches.....	do	2.50	7.00
Lumber, native, rough.....	per M.	20.00	25.00
Lumber, first quality, planed.....	do		40.00
Lumber, California or Oregon, best.....	do	30.00	40.00
Shingles, native.....	do	2.50	3.00
Shingles, Oregon.....	do	2.75	4.00
Wood, native pine.....	per cord	5.00	6.00

Clothing, dry goods and other articles easily transported and bearing light freight charges are but slightly higher in price than in Eastern and Middle States.

THE DEMAND FOR LABORERS.

In recent years it has been impossible to get laborers enough to carry on the work in the State. By this is meant competent workmen. Unskilled labor has been extremely scarce, and large undertakings have had to wait before being launched.

While the living expenses in the State are a little higher than in the East, the wages paid are so much higher that a steady man can save a great deal more money while laboring here than at any Eastern place. The demand for reliable men in every avenue in the State is on the increase, and there is no legitimate reason to offer for idleness.

Below is given a table of approximate wages in the State:

OCCUPATION.	WAGES (PER DAY).		OCCUPATION.	WAGES (PER MONTH)	
Carpenters.....	\$2 .00	to \$3 .50	Coal miners.....	\$35.00	to \$75.00
Machinists.....	3.00	5.00	Engineers.....	75.00	125.00
Painters.....	2.50	3.50	Agents & operators....	50.00	115.00
Tinners.....	3.00	3.50	Railroad brakeman....	50.00	80.00
Stonecutters.....	3.00	5.00	Butchers.....	50.00	75.00
Plasterers.....	3.00	3.50	Conductors.....	85.00	135.00
Roustabouts.....	1.50	2.00	Locomotive firemen...	65.00	100.00
Miners.....	3.00	3.50	*Cowboys.....	25.00	40.00
Bricklayers.....	4.00	5.00	*Horse wranglers.....	20.00	30.00
Shoemakers.....	2.50	3.50	*Farm hands.....	20.00	35.00
Gasfitters.....	3.00	4.00	*Sheep herders.....	30.00	50.00
Day laborers.....	1.50	2.00	*Teamsters.....	20.00	40.00
Upholsterers.....	2.50	3.50	*Cooks.....	20.00	50.00
Cabinetmakers.....	2.50	3.50	*House servants, men .	20.00	35.00
Plumbers.....	2.50	5.00	* " women...	12.00	35.00
Tailors.....	2.50	3.50	*Lumbermen.....	35.00	40.00
Bakers.....	2.00	3.00			
Railroad trackmen.....	1.50	1.75			
Plasterers' and masons' helpers.....	2.00				

*Includes board.

HOMES FOR THE MILLIONS.

"In the account of the rise and development of agriculture in Wyoming," says Professor Buffum in the *Twentieth Century Farmer*, "there is no ancient history. The story is neither old in years nor old in having been often told, for no State can boast of more recent agricultural beginnings, and had I the space, the part that has been told would make interesting repetition. Wyoming is new. All that is in it is new and fresh. A little bit of yesterday's history woven into fiction makes the best selling book of the time and in this mountain region fact is even stronger than fiction. Strong men have had to do with the rise of this commonwealth, men with individual strength of mind and initiative, who have not been content to adopt the laws of older States, but, profiting by the experience of others, have struck out on entirely new lines. The result has attracted world-wide attention. Though young in years and small in population, few States are better known. The Wyoming irrigation law, as the one among all those framed in the West which has been best adapted to meet our conditions and protect the user of water, is an illustration of the care and intelligence with which our people have builded. While this law is not the only one which could be named that was many years in advance of such institutions existing in other states, the irrigation law has been widely indorsed and copied and is directly connected with the subject of this paper."

Wyoming is to-day sparsely populated, there is only about one person for each square mile, and there are single blocks of country where there is not a permanent abode for an area of 200 square miles. There are thousands of acres of excellent land awaiting tillage. A great deal of it has been settled upon; but it can be purchased or leased at reasonable terms. Farm products always command a good price, and many localities are dependent upon outside States to supply them. There are millions of acres of excellent range lands that are controlled by the government awaiting settlement, and millions of acres of good land awaiting some good company to build a ditch under the Carey Act and provide it with water so that it can be settled. This great State can support a population of at least 3,000,000 people. Its industries are diversified and one class is necessary to develop the other. The miner will need the products of the agriculturist, stock man and manufacturer, for he will be wholly unable to get the necessities in any other way than by purchasing them, that is, the mining districts are not available for any other pursuits. Mining will eventually be the great industry that will push the State along. It will not be many years until Wyoming will annually produce 10,000,000 tons of coal, and this industry alone will require nearly double the population that the State has to-day to carry it on successfully. The development of the oil, iron, soda, and hundreds of lesser industries will demand an army of workmen, that the State up to the present has had no conception of. Wyoming is now the State to go to, to "grow up with the country." It offers inducements alike to all classes, and has homes for all who wish to take advantage of its wonderful natural gifts.

RAILROADS

FIVE GREAT SYSTEMS

Five great railroad systems have entered the State—Union Pacific, Oregon Short Line, Burlington, North Western and Colorado & Southern. The road of the most importance to the State up to the present time is the Union Pacific, whose great transcontinental highway extends across the southern part. This is the most feasible railroad route across the Rocky Mountains. At Cheyenne it connects with the Denver branch of the same system, and at Granger with the Oregon Short Line that extends into Idaho and Montana and also to the Pacific Coast.

The Colorado & Southern extends from Cheyenne northward to Orin Junction, and has a spur from Badger to the eastward to connect its main line with the Hartville iron mines. From Cheyenne southward, this railroad depends upon the Union Pacific to connect with its Colorado lines.

UNION PACIFIC IMPROVEMENTS IN WYOMING.

Beginning with the time that the Union Pacific Railroad was secured by its present owners, there has been a steady and almost continuous improvement in its physical condition and many millions of dollars have been spent

in straightening the line, reducing grades, ballasting, rebuilding bridges, double tracking and providing safety to both passenger and freight trains with automatic block signals and interlocking devices.

This fact applies particularly to that portion of the Union Pacific through the State of Wyoming. Practically the entire line in this State has been rebuilt or remodeled, and its present condition is as good as, if not better, than any railroad in the entire United States. The climate is favorable to the maintenance of this excellent condition, the general character of the materials used in making the embankments is good, and together with the famous gravel ballast used, it is possible, not only to build but also to preserve a smooth, easy riding, and practically perfect roadbed.

Just east of Cheyenne the line was rebuilt over what is known as Archer Hill, reducing the grades and straightening the line and making this portion (about 8 miles) double track. This double track was extended west 27 miles from Cheyenne to Buford, Wyo., at the top of the steep climb on the eastern slope of the mountains, at the same time making an expensive change on this steep grade between Borie and Buford.

Over this region the Union Pacific opened in 1901 a new line piercing the mountains over which the Union Pacific trains had been climbing since the road was opened.

It was decided to make this work as substantial as possible, eliminating all bridges, and wherever waterways were necessary for drainage, to have substantial stone arches, masonry and steel structures or cast iron pipe. Where heretofore such large valleys as Texas, Lone Tree and Dale Creeks were bridged, the company, at largely increased expense, has made solid embankments, giving the greatest amount of safety at all times from wash or any other cause.

The embankments and cuts were made unusually wide, and the bridges made as perfect as modern science can suggest.

On account of crossing the Rocky Mountains with this low grade (a proposition that was not dreamed of until the last few years) the magnitude of the cuts and fills assumes a bigger scale than anything in this country for the same distance.

To secure such a low rate of grade and easy curvature, it was found necessary to put a tunnel through Sherman Hill, through hard granite rock, 1,800 feet long, of ample dimensions for the largest loads to pass through.

Precautions were taken to reduce the grade through the tunnel, so that there shall be no inconvenience from smoke or foul air. This, in addition to the rarefied atmosphere in that country, keeps the tunnel clear and one can clearly see from one end to the other at all times.

On this line, besides the well known Dale Creek crossing, there are other fills, such as the Lone Tree, Texas Creek, Spring Creek and others. Spring Cañon and other points almost equal in size the famous crossing of Dale Creek.

To show the immensity of the work, let it be stated that the crossing of Dale Creek is 900 feet long, 120 feet high, and that 500,000 cubic yards of Sherman gravel was used in constructing the embankment; that the crossing

of Lone Tree Creek is about 800 feet long, 125 feet high, and has 290,000 cubic yards of fill in the embankment. This fill was made in a novel way—by running small dump cars out on a suspension bridge built over the cañon. All the embankments are made of the celebrated Sherman disintegrated granite.

This new line of Sherman Hill crosses the Rockies at a summit which is 237 feet lower than the old crossing, thus making the highest elevation reached by the Union Pacific 8,010 feet above sea level, instead of 8,247 feet as formerly.

Tie plates were used on all ties; heavy eighty-pound section new steel rails, with first-class joint fittings, and the most powerful switches, all conducing to the safety of traffic over this line.

Water has been taken from the finest kind of springs along the line and piped long distances, so as to get the best quality, not only for the locomotives but for other purposes.

The portion from Buford to Hermosa, on which Sherman Tunnel is located, is single track, but from Hermosa to Laramie (19 miles) both the old and new lines are operated as double track, although the two lines are some distance apart. East bound trains are run over the new line, which is built with the same low rate of grade (43 feet per mile) as the balance of the line through the mountains, and west bound trains run over the old line which is all down hill toward Laramie.

The first three cut-offs authorized and built were those between Laramie and Rawlins, viz: Bona to Bosler, Cooper's Lake to Lookout, Lookout to Medicine Bow. This work involved the construction of about forty-five miles of line and accomplished a saving in distance of practically nineteen miles. The improvements consist in the reduction in grades from seventy-five feet to forty-three feet per mile, and an almost straight instead of a crooked line. All of this was heavy work.

From Bona to Bosler is a cut-off of fifteen miles, reducing the distance three miles, as compared with the old line, having only one curve from one end to the other. The reduction of the grade to the standard of forty-three feet to the mile in both directions, makes it possible to run trains at a high rate of speed with no discomfort to passengers.

The cut-off from Cooper's Lake to Lookout is four miles in distance, and almost an airline. To show a comparison the new line crosses the old one at seven different places.

With the same standards in mind, another piece of line was built from Lookout to Medicine Bow, twenty-six miles long, saving a distance, as compared with the old line, of twelve miles. Reducing the curvature to the minimum standard adopted by the company necessitated heavy cuts and fills, notably the one at Foot Creek.

The Foot Creek fill, as it is known, an embankment forty feet high and 2,000 feet long, was built by the use of grading machines, which plowed and loaded the dirt into patent dump wagons, in which it was hauled and dumped into the embankment. The equipment employed consisted of five graders and forty dump wagons. The material obtained from the borrow pits was a sandy loam, and the work lasted from May to November, 1899. This piece of

work has been pronounced one of the best constructed large railroad embankments that has been built in recent years. The material, having been spread in thin layers and rolled with the wheels of the wagons, forms a firm embankment. It may here be mentioned that the bases of many of the larger embankments were built in this way.

The cuts and fills before specified were made amply wide; culverts and bridges of the most improved kind, of cast-iron pipe, masonry and steel were built; the best of drainage being given to the road in all respects.

During 1906, the cuts and fills were widened, bridges extended or rebuilt, and a second track laid and put in operation from Lookout to Hanna, approximately 49 miles. Two large bridges had to be rebuilt for double track, one over Rock River just east of the station of the same name, and one over the Medicine Bow River about a mile east of Medicine Bow Station.

The building of a new line, a distance of about eight miles, made a saving of **four** miles, using the old branch line from Allen to Hanna, the new line extending from Hanna west to the Junction at Dana with the old line.

This removed a crooked piece of road, with heavy grades and crossed a spur of the main mountain range, at a lower elevation.

The cut at the summit is one and one-quarter miles long, and sixty-five feet deep at the highest point, passing through various formations of coal, including an eight-foot seam.

Other cuts and fills along this piece of line, although heavy work, are of somewhat less magnitude than that just described.

This new line involved the moving of approximately 1,700,000 cubic yards of material, of which 1,310,000 cubic yards was embankment and 310,000 cubic yards solid rock excavation. Thus, the eight miles of road (Hanna to Dana) averaged over 220,000 cubic yards per mile. This was largely concentrated in two miles of work, there being two fills of 500,000 cubic yards each, being probably the heaviest yardage ever handled for single-track railroad.

The large cut just west of the Edson tunnel, another piece of heavy work, is 1,000 feet long and 80 feet deep. It eliminates three sharp reverse curves, two bridges and reduces curve from five to three degrees.

The line was changed entirely at the North Platte River crossing at Fort Steele so as to take out curvature and reduce the grade. To accomplish this it was necessary to put in a new steel bridge across the river, upon concrete piers and abutments with pile foundations, consisting of four spans of deck plate girder bridge, 103 feet long each, and an additional deck girder span at each end of thirty-five feet in length, built according to modern construction.

It may be of interest to mention that the North Platte River, which is crossed just before arriving at Fort Steele, is 4,051 feet higher here than the same stream at North Platte City, near the junction of the two Plattes in the State of Nebraska.

A great improvement was made in the line between Fort Steele and Rawlins, by rectifying grades, in some places making lifts in old grades of fifteen feet, all of it heavy work: and also from Rawlins to Tipton, a distance

of sixty miles, containing three summits and crossing the Continental Divide at Creston, where the waters of the Atlantic and Pacific separate. The altitude of this divide is 7,100 feet. On the new line the Continental Divide is crossed with such perfect ease and comfort that it would scarcely be known but for the historic legend standing like a lonely sentinel on the crest of the famous summit. On this new line large cuts and fills were made, heavy cast-iron pipe and stone arches were used wherever possible, so as to have the embankments solid, and where not possible, steel bridge and masonry are used.

The road is laid with 80-pound steel rails, and the best fittings, grades and curvatures reduced to the minimum, good water secured by drilled wells; the line thoroughly ballasted with Granger gravel, and what was once a hard journey for the early emigrant is now one of great comfort and pleasure. A portion of this line, forty-two miles, from Rawlins to Wamsutter, was widened for second track in 1907 and 1908, and track laid and put in operation for eighteen miles of the distance from Rawlins west. The balance of the track work is under way and will be completed during the summer of 1909.

From Wamsutter to Green River is single track, excepting twenty-six miles between Point of Rocks and Blairtown, the first station west of Rock Springs, where a second track was built and put in operation during 1906. Just east of Rock Springs two short spurs have been built providing an outlet for some new coal mines.

A new piece of line was built from Green River west to Bryan, a distance of about thirteen miles. On this line westward for a short distance, from Green River to Peru, the summit of a mountain, the Union Pacific has done a piece of engineering of stupendous magnitude. After leaving Green River, the Union Bluffs of Green River, almost precipitous cliffs are skirted. The new line was built right through high walls of rock, carrying it a little farther away from the river, straightening the road and curvature, so that it is well nigh impossible to recognize the old line. This line has no bridges on its entire length, every water course being carried under the embankments by cast iron pipes or stone arch culverts. It reduces the grade in each direction between Green River and Bryan to the standard required by the Union Pacific Company in remodeling its road bed. It should be stated that in the construction of this line, it became necessary to do a great deal of temporary work where the old line and new line were in conflict, so that traffic might be carried on over the old line while the new one was in process of construction.

At Review Station, the elevation is about 200 feet above Green River, affording a beautiful view of the river in both directions.

This line is ballasted with gravel from the Granger Gravel Pits.

Over this entire distance, a second track has been built and carried on westward to Granger, a total distance of 30 miles.

Among the many improvements, the cut-off from Leroy to Bear River, Wyo., is one of the first importance and avoids the celebrated Tapioca Hill, at best a difficult piece of road to operate at all times of the year, but particularly in winter. Through this section the old line found

its way as best it could, with many a sharp and dangerous curve, and grades so heavy that helping engines were required for all heavy trains in both directions.

Leaving Leroy, the new line, with graceful sweep, follows from side to side the historic Mormon Pioneer Valley, a distance of 11.45 miles, to Aspen Tunnel. This is the largest single piece of work ever undertaken by the Union Pacific. It pierces Aspen Ridge, one of the eastern foothills of the Wasatch Range, and is 5,900 feet long. Owing to the character of the material encountered, and the presence of water in large quantities, the construction of this tunnel is one of peculiar interest. The formation is the carboniferous in which are found soft shells and sand stone uplifted here by some great convulsion of nature, and left tilted at an angle of about 25 degrees from the horizontal. To hasten the work of construction, a central shaft was sunk, the top of which is 331 feet above grade. From the bottom of this, headings were started east and west, and were pushed as rapidly as possible to connect with the end headings, until a heavy flow of water caused a suspension of work. The greatest depth below the surface is 456 feet. The highest point above sea level reached is 7,296 feet. The tunnel is lined throughout with timber and finally with concrete, making it one of the most perfect pieces of work of the kind on the continent.

Work was begun at the shaft November 13, 1899, at the east end heading April 2, 1900, and at west end heading March 14, 1900.

On the cut-off there is no grade greater than 43 feet per mile, and no curve heavier than 3 degrees and 36 minutes. The grade through the tunnel is 21 feet per mile.

This new line is twenty-two miles long and shortens the distance ten miles as compared with the old line with very small amount of curvature, and has long distances of straight line where high speed can be attained without difficulty.

The total length of double track line in Wyoming is 201 miles or nearly one half the entire distance through the State. In addition to the safety provided by double track, the entire line is protected by automatic block signals, and distant switch signals at each station to indicate open switches, the ends of the various stretches of double track also being protected by signals.

A signal maintainer is placed on every ten miles of line who is responsible for the proper care and perfect condition of each signal and it is an interesting fact that the operation of signals shows only one failure in 15,000 signal movements, thus showing that the protection afforded is practically perfect.

STAGE LINES.

In Wyoming, even in these days, it is necessary to depend to a great extent upon the stage lines to get about the country unless one desires to travel by private conveyance. From all of the important towns along the railroads, and, in some instances, from mere stations, one will find stages of all kinds and descriptions leaving for interior points, so it is possible to reach any section of the State in a comparatively short time.

The following is a partial list of the stage lines, giving the starting points and destinations, together with main directions:

CARTER, WYO.—Stage, daily except Sunday, 1.00 p. m. to Fort Bridger, 10 miles, \$1.00; Mountain View, 16 miles, \$1.50; Lone Tree, 36 miles, \$3.00; Lyman, 10 miles, \$1.00; Monday, Wednesday and Friday, 1.00 p. m. for Burnt Fork. Baggage allowance, 50 pounds.

LARAMIE, WYO.—Stage, daily except Sunday, 6.00 a. m. for Nelson, \$1.00; Woods, \$2.00; Jelm, \$2.50; Boswells, \$3.00; Langhoffs, \$4.50; Pinkhampton, \$5.00; Cowdry, \$5.00; Walden, \$5.00. Round trip to Pinkhampton, Cowdry and Walden, \$9.00. Daily except Sunday, 6.00 a. m. for Centennial, \$2.50; Holmes, \$3.50; Keystone, \$3.75. Hand baggage allowed only; trunks and bedding extra. Monday, Wednesday and Friday, 6.30 a. m. for Sibylle, \$3.00. Laramie, Hahn's Peak & Pacific Railway leaves Laramie daily 7.00 a. m. for Centennial. Fare, \$1.55. Connection at Walden Tuesday, Thursday, and Saturday for Higo, Colo., 12 miles; rate from Walden, \$1.00; Spicer, 18 miles, \$1.50; Rand, 28 miles, \$2.00; Haworth, 27 miles, \$2.00. Connections at Cowdry, Tuesday, Thursday, and Saturday for Pearl, 20 miles; rate from Cowdry, \$2.50; Collins, 20 miles, \$2.00.

MARKET LAKE, IDA.—Stage daily at 11.40 a. m. for Menan, 6 miles, 50 cents; Lewisville, 6 miles, 50 cents. Baggage allowance, 50 pounds.

MONIDA, MONT.—Stage at 7.30 a. m.; arrive at Lake View at 12 m.; Lake Idaho at 6.00 p. m., except Sunday. Price for stage, 10 cents a mile, straight. No round trip rates. Baggage allowed free, 30 pounds. Hunting parties are allowed special rates according to number of party. Yellowstone Park, 70 miles, daily, except Sunday, also. Baggage in excess of 30 pounds handled reasonably.

MONTPELIER, IDA.—Stage daily except Sunday at 8.00 a. m. and 3.00 p. m. for Paris, 10 miles, 50 cents; Ovida, 6 miles, 30 cents. Stage daily except Sunday at 8.00 a. m. for Bloomington, 12 miles, 60 cents; St. Charles, 18 miles, 75 cents; Fish Haven, 22 miles, \$1.00; Garden City, Utah, 30 miles, \$1.50; Meadowville, 40 miles, \$1.75; Laketown, 45 miles, \$2.00; Randolph, 61 miles, \$2.50. Daily except Sunday at 10.00 a. m. for Afton, Wyoming, 50 miles, \$2.00. Baggage allowance, 50 pounds.

RAWLINS, WYO.—Stage, daily, at 7.00 a. m. Myersville, 100 miles, \$10.50; Lander, 160 miles, \$15.00; Hailey, 108 miles, \$12.00; Fort Washakie, 170 miles, \$16.00; Shoshone Agency, 160 miles, \$16.00; daily except Sunday, at 7.00 a. m. Slater 85 miles, \$8.00; Baggs, 65 miles, \$6.00; Dixon, 75 miles, \$7.00; every other day for Dillon, 51 miles, \$7.00. Baggage allowance; 30 pounds Lander and Fort Washakie; 35 pounds to Slater, Baggs, and Dixon; 40 pounds to Dubois and Shoshone Agency.

WALCOTT, WYO.—Stage, daily, at 30 a. m. for Saratoga, 2.57 miles, \$3.00; round trip, \$5.00; Grand Encampment, 50 miles, \$5.00; round trip, \$9.00. Stage, daily, 8.00 a. m., for Pearl, 65 miles, \$8.50; Riverside, 48 miles, \$5.00; Battle, 60 miles, \$7.00; Rambler, 65 miles, \$8.00; Monday, Wednesday and Saturday, stage connection from Saratoga for Bennet.



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tural land are yet open for settle-
ment : : : : : : : : : :

For the Stock-Raiser

Immense acres of ex-
cellent grazing lands
can yet be secured :

For the Miner

The great Mountains of the West
await but the opening to become the
source of large fortunes : : : : :

For the Business Man

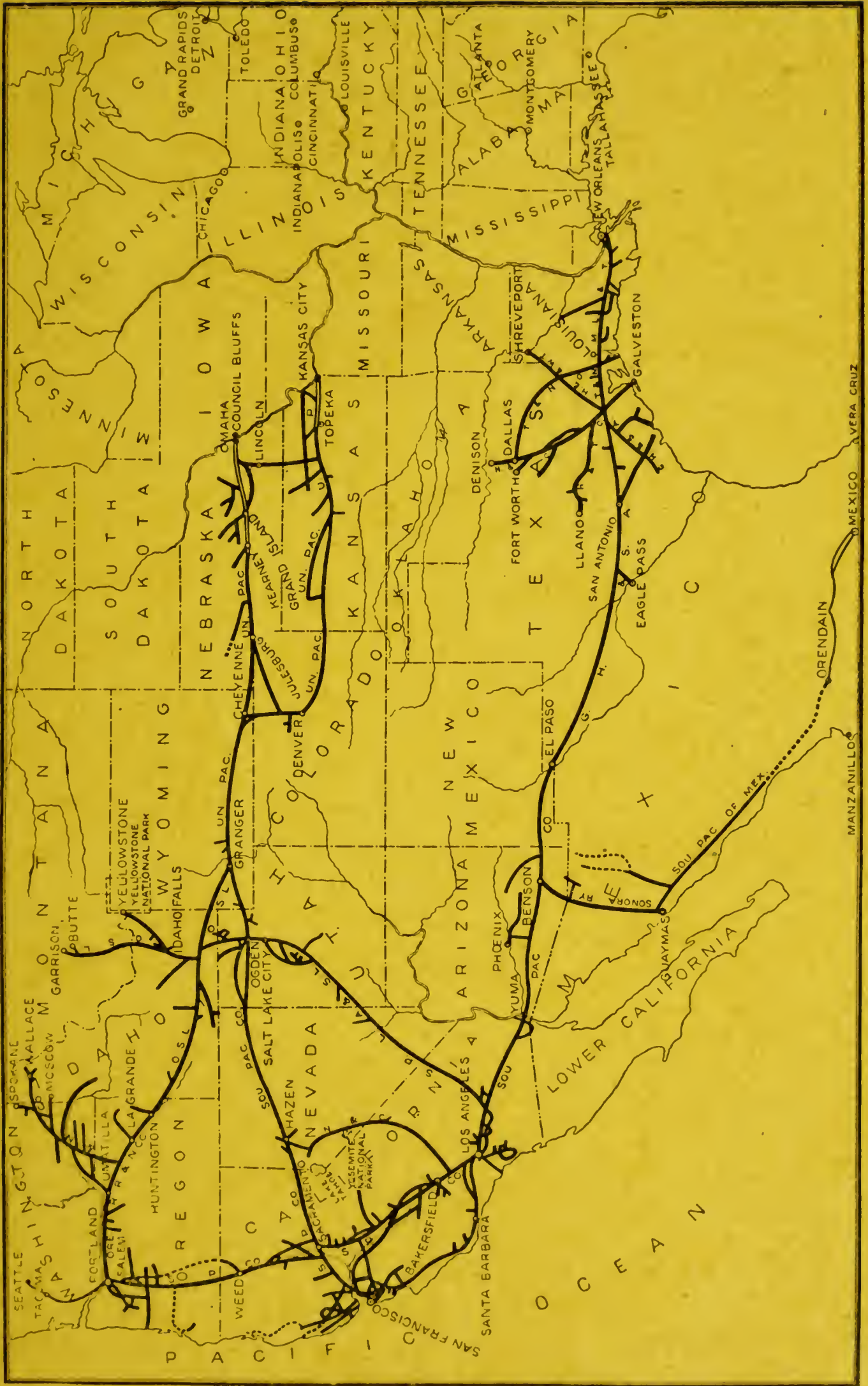
The growing cities
and towns of the
West are daily offering opportunities for investment of capital and
location of industries which are not surpassed by older sections of the
United States : : : : : : : : : : : : : : : :

For information about the States of Nebraska, Kansas,
Wyoming, Colorado, or Utah, read the

UNION PACIFIC PAMPHLETS AND BULLETINS

of these States. They contain a complete and comprehensive
description of the agricultural resources, stock raising, com-
mercial and manufacturing interests, with statistics in regard
to climate, population, industries, etc., together with much
general information. These can be obtained on application to
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WYOMING

RESOURCES, POPULATION,
INDUSTRIES, OPPORTUNITIES,
AND CLIMATE



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